Programmable Logic Controllers

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IDEC

For more information on this product family, visit our website.
Additional resources include:

- New and updated product information
- Downloadable software demos & upgrades
- Part configuration tool & cross reference
- Online stock check & ordering
- IDEC field sales & distributor search
- Online literature request
- Downloadable manuals & CAD drawings
- Manufacturer's suggested retail price list
- Product training schedule & locations
- Advertising & trade show schedules
- Press releases & FAQs

www.idec.com/plc

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Selection Guide

Programmable Logic Controllers

		MicroSmart Family		OpenNet Controller (ONC)	SmartRelay
		MicroSmart Pentra	MicroSmart		
Page		3	8	45	56
Appearance					
Rated Voltage		24V DC, 100-240V AC	24V DC, 100-240V AC	24V DC	12-24V DC, 24V AC/DC, 100-240V AC/DC
Max. Digital I/O		512	264	480	50
Max. Analog I/O		56	56	42	10
Program Capacity		62.4K bytes	31.2K bytes	32K bytes	2K bytes
Max. Communication Ports		7	2	3	1
Networking	**Modbus RTU/ASCII**	Yes	-	-	-
	Modbus TCP	Yes			
	AS-Interface	Yes	Yes	-	Yes
	LonWorks	-	-	-	Yes
32-bit Data		Yes	-	Yes	-
Floating Point Math		Yes	-	-	-
High-Speed I/O Freq.		100KHz	20KHz	10KHz	2KHz
Approvals					

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MicroSmart Pentra

Micro-controllers play an increasingly central role in today's industrial applications. You have many controllers to choose from, but the one you turn to most often is the one that fits best, physically and practically. You'll find IDEC PLCs in various applications from water treatment plants to HVAC to printing press operations and more. They're always dependable, easy to program and almost as smart as you are.

IDEC brought some of the first micro-PLCs to the market, and has been meeting your changing control automation needs for decades. Now with the MicroSmart Pentra, you get the fastest and most full featured programmable logic controller there is.

International Approvals

All MicroSmart controllers have regulatory agency certifications for the worldwide market including being cULus Listed for Class1 Division 2 Hazardous Locations, TUV approved, CE, and certified for marine use by ABS and Lloyd's Registry.

Rugged, Compact, Modular Design

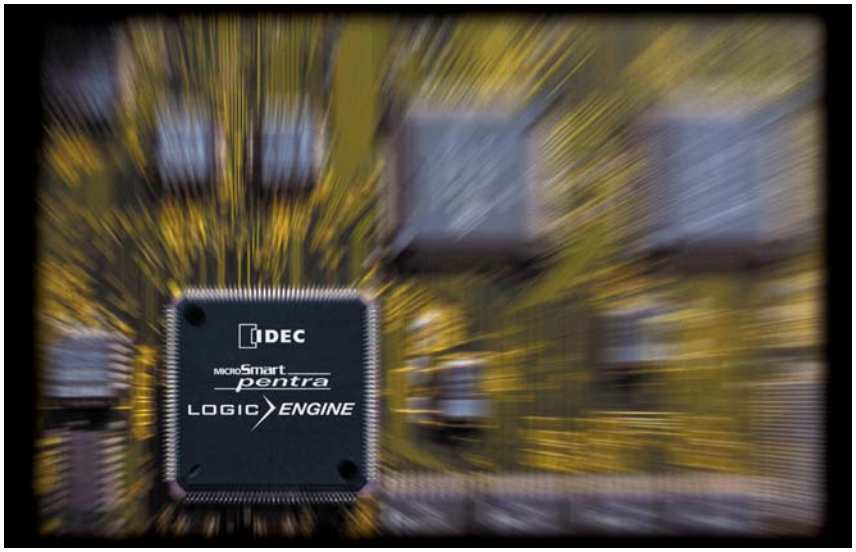
Every CPU module comes equipped with embedded I/O points, and you can conveniently add snap-on expansion modules for up to 512 I/Os based on your system requirements. All MicroSmart controllers are DIN-rail or panel mountable.

Write & Run Your Programs Now

Relax. Programming the MicroSmart is fast and straightforward. Use IDEC's WindLDR software to configure, modify and monitor your MicroSmart programs with ease. This powerful and intuitive software makes it simple to get your system up and running.

Upgrade Without Downtime

For added convenience, the same expansion I/O modules and accessories can be used on both the MicroSmart and MicroSmart Pentra controllers. In fact, both controllers share the same architecture, instruction set and programming software. The use of a single software platform for all IDEC PLCs means you won't have to reprogram or learn a new system to move from one to another.



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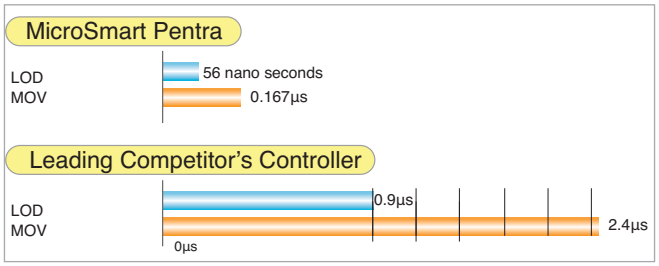
MicroSmart Pentra Performance

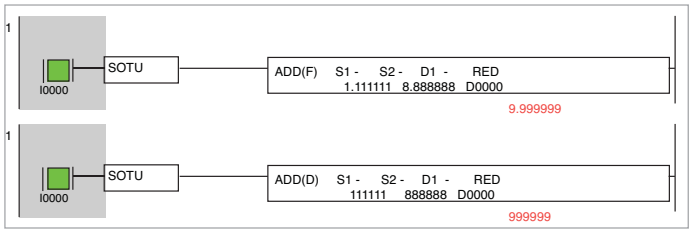
The Fastest Micro Controller in its Class!

MicroSmart Pentra is the fastest micro controller available in its class. The overall processing speed of the new Logic Engine CPU is 16 times faster than our competitor's average controller.



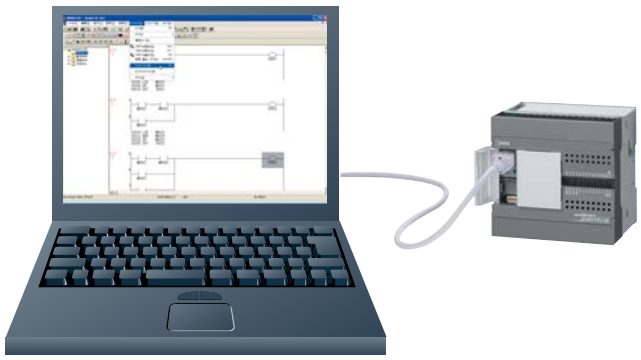
Supports 32-bit data and floating point math

MicroSmart Pentra supports double-word, floating point math operations, capturing and storing large values, and returning computed results accurate to seven decimal places.



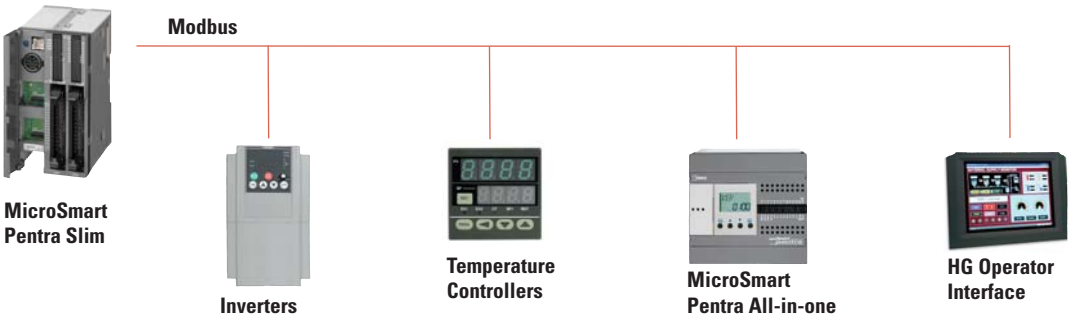
Field Upgradeable Firmware

Extend the life of your PLC! Upgrade your firmware on-site as new functions and versions become available.



Built-in Modbus RTU/ASCII master & slave, and Modbus TCP (1:1) de-facto protocol

Modbus messaging protocol is a de-facto protocol in industrial networking. Communication with other devices on a Modbus network can be easily achieved with built-in Macros instructions.



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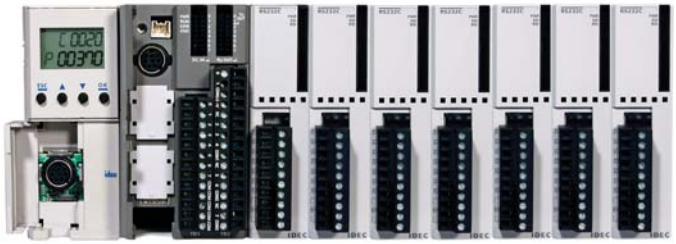
MicroSmart Pentra Performance

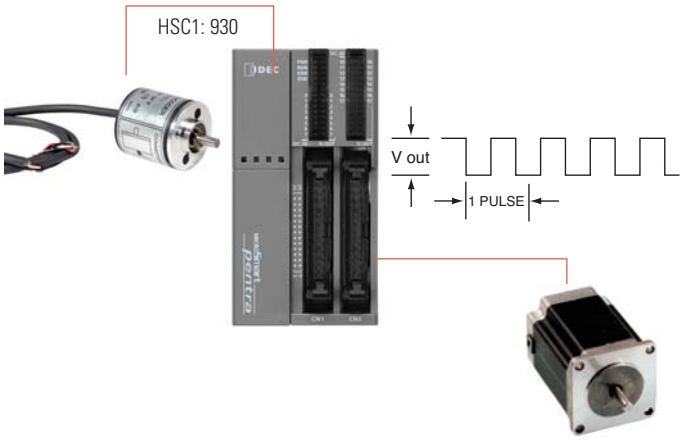
Maximum 7 Communication Ports

MicroSmart Pentra models can accomodate up to a total of seven communication ports. Now you can connect your HMI, PC, barcode reader, RFID equipment, printer and more.



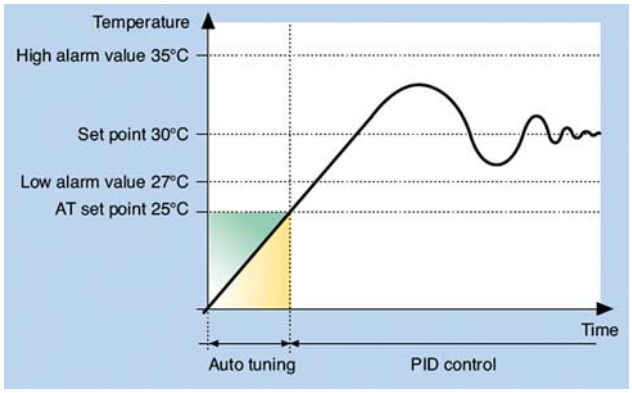
Integrated 100KHz Fast Inputs and Outputs

Configure up to four high-speed inputs from high-speed output devices such as rotary encoders or proximity switches at a maximum frequency of 100KHz, independent of the scan time. Up to three high-speed outputs can be used for simple positioning controls for stepper or servo motors.



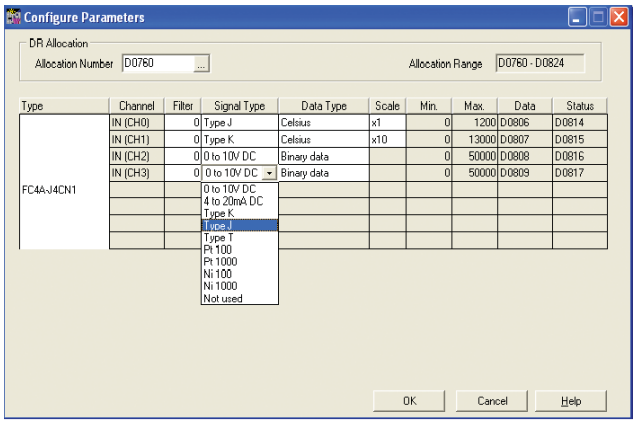
56 PID Loops

PID is the standard solution to many industrial process controls because of its accuracy and stability. With up to 56 PID loops and advanced auto-tuning features, your systems can be tuned to optimum values for the desired control response.



Maximum 56 Analog I/O

Your options include 0-10V, 4-20mA, RTD, thermocouple, thermistor inputs and +/-10V output. With built-in Macro instructions, configuring analog parameters is just a step away.



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Compact & Modular Design

All-in-One CPU

Optional RS232C adapter

Optional RS485 adapter

Optional RS485 adapter - screw type

Built-in RS232C port

Built-in Potentiometers (x2)

All-in-one CPU

Optional HMI module for monitoring

FC5A-C24R2C

Optional EEPROM memory cartridge

Optional Real Time Clock cartridge

Slim CPU

Optional HMI module for monitoring

Optional HMI base module or RS232C/RS485 Comm. Modules

Optional RS232C adapter

Optional RS485 adapter

Optional RS485 adapter - screw type

Built-in Potentiometer

Built-in 0-10V analog input

Built-in RS232C port

Slim CPU

Optional Real Time Clock cartridge

Optional EEPROM memory cartridge

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MicroSmart Pentra CPU Part Numbers

All-in-One

Appearance	Part Number	Power	I/O Points	Input	Output	Expandability
	FC5A-C10R2C	24V DC	10 (6 in/4 out)	24V DC (Sink/Source)	Relay	N/A
	FC5A-C10R2	100-240V AC				
	FC5A-C16R2C	24V DC	16 (9 in/7 out)			
	FC5A-C16R2	100-240V AC				
	FC5A-C24R2C	24V DC	24 (14 in/10 out)			88 Maximum I/O (up to 4 expansion modules)
	FC5A-C24R2	100-240V AC				

Slim

Appearance	Part Number	Power	I/O Points	Input	Output	Expandability
	FC5A-D16RK1	24V DC	16 (8 in/8 out)	24V DC (Sink/Source)	6 Relays, 2 Transistor Sink	496 Maximum I/O (up to 15 expansion modules)
	FC5A-D16RS1				6 Relays, 2 Transistor Source	
	FC5A-D32K3*		32 (16 in/16 out)		Transistor Sink	512 Maximum I/O (up to 15 expansion modules)
	FC5A-D32S3*				Transistor Source	

*See page 20 for MIL Connector Cables and Breakout Modules.

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MicroSmart Performance

Features:

- Available in 10, 16, 20, 24, and 40 I/O CPUs.
- PID Controls
  -Program up to 14 PID loops
- High Speed I/O
  -Built-in 4 high speed inputs
  -Single or Dual Phase
  -Max. 20KHz frequency
- Built-in 2 High speed outputs (Slim model only)
- Configure up to 264 I/O Points
- Data link up to 32 MicroSmart and Pentra CPUs
- Using RS485 communication module/port, you can create a network of up to 32 CPUs.
- Worldwide Approvals
  -cULus listed, CE marked
  -Class 1 Div. 2 for hazardous locations
  -Lloyds Registered and ABS approved for shipping industry

MicroSmart CPU Part Numbers

All-in-One

Appearance	Part Number	Power	I/O Points	Input	Output	Expandability
	FC4A-C10R2C	24V DC	10 (6 in/ 4 out)	24V DC (Sink/Source)	Relay	N/A
	FC4A-C10R2	100-240V AC				
	FC4A-C16R2C	24V DC	16 (9 in/ 7 out)			
	FC4A-C16R2	100-240V AC				
	FC4A-C24R2C	24V DC	24 (14 in/ 10 out)			88 Maximum I/O (up to 4 expansion modules)
	FC4A-C24R2	100-240V AC				

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MicroSmart CPU Part Numbers

Slim

Appearance	Part Number	Power	I/O Points	Input	Output	Expandability
	FC4A-D20RK1	24V DC	20 (12 in/8 out)	24V DC (Sink/Source)	6 Relays, 2 Transistor Sink	244 Maximum I/O (up to 7 expansion modules)
	FC4A-D20RS1				6 Relays, 2 Transistor Source	
	FC4A-D20K3				Transistor Sink	148 Maximum I/O (up to 7 expansion modules)
	FC4A-D20S3				Transistor Source	
	FC4A-D40K3		40 (24 in/16 out)		Transistor Sink	264 Maximum I/O (up to 7 expansion modules)
	FC4A-D40S3				Transistor Source	

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Digital I/O Expansion Modules

Features:

- 15 modules to choose from
- Available with Screw or MIL connectors
- Easy snap-on
- Available 8, 16 or 32 point modules
- Up to 512 I/O can be configured in the Pentra and 264 I/O in the MicroSmart system

Input Modules

Appearance	Part Number	Input	Input Points	Terminal
	FC4A-N08A11	100-120V AC	8	Removable Screw Terminals
	FC4A-N08B1	24V DC		
	FC4A-N16B1		16	
	FC4A-N16B3			MIL Connector (ribbon cable)
	FC4A-N32B3		32	

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Digital I/O Expansion Modules

Output Modules

Appearance	Part Number	Output	Output Points	Terminal
	FC4A-R081	Relay	8	Removable Screw Terminals
	FC4A-R161		16	
	FC4A-T08K1	Transistor Sink	8	
	FC4A-T16K3		16	MIL Connector (ribbon cable)
	FC4A-T32K3		32	

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Digital I/O Expansion Modules

Output Modules (cont.)

Appearance	Part Number	Output	Output Points	Terminal
	FC4A-T08S1	Transistor Source	8	Removable Screw Terminals
	FC4A-T16S3		16	MIL Connector (ribbon cable)
	FC4A-T32S3		32	

Combination I/O Modules

Appearance	Part Number	Input	Output	I/O Points	Terminal
	FC4A-M08BR1	24V DC (Sink/Source)	Relay	8 (4 in/4 out)	Removable Screw Terminals
	FC4A-M24BR2			24 (16 in/ 8 out)	Wire Spring Clamp

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Analog I/O Expansion Modules

Features:

- 8 modules
- 0-10V, 4-20mA, RTD, Thermocouple, Thermistor inputs, 0-10V DC or -10V DC to 10V DC output
- 12 or 16-bit resolution
- Fast conversion time
- Maximum of 56 I/O can be configured in the MicroSmart Pentra system
- Easy to configure using a Macro instruction in WindLDR

Modules

Appearance	Part Number	I/O Points	Input	Output	Resolution	Terminal
	FC4A-J8C1	8 (8 inputs)	0-10V DC, 4-20mA	–	16-bit (0-50000)	Removable Screw Terminals
	FC4A-L03A1	3 (2 inputs, 1 output)		0-10V DC, 4-20mA	12-bit (0-4095)	
	FC4A-J2A1	2 (2 inputs)		–		
	FC4A-J4CN1	4 (4 inputs)	0-10V DC, 4-20mA, RTD, Thermocouple	–	16-bit (0-50000)	
	FC4A-L03AP1	3 (2 inputs, 1 output)	RTD, Thermocouple	0-10V DC, 4-20mA	12-bit (0-4095)	

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Analog I/O Expansion Modules

Modules (cont.)

Appearance	Part Number	I/O Points	Input	Output	Resolution	Terminal
	FC4A-J8AT1	8 (8 inputs)	Thermistor (NTC/PTC)	–	12-bit (0-4000)	Removable Screw Terminals
	FC4A-K2C1	2 (2 outputs)	–	-10 to 10V DC, 4-20mA	16-bit (0-50000)	
	FC4A-K1A1	1 (1 output)	–	0-10V DC, 4-20mA	12-bit (0-4095)	

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Communication Modules

Web Server Module

Features:

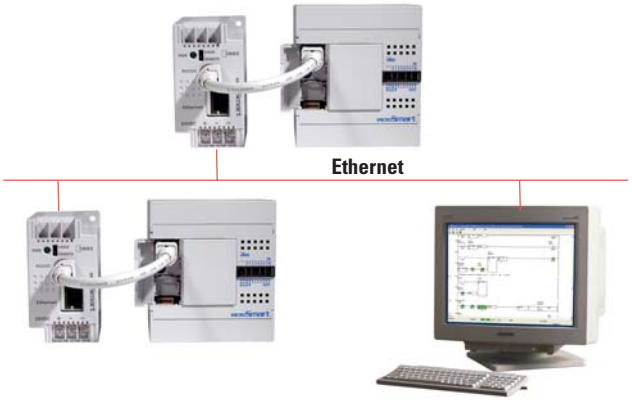
- Easy to configure
- Comes with interface cable and Quick Start Guide

Part Numbers

Appearance	Part Number	Description
	FC4A-ENET	Web Server Module (includes cable and Quick Start Guide)
	FC9Y-QS100-0	Quick Start Guide

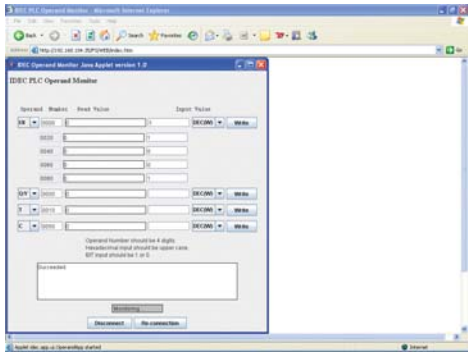
Remote Maintenance

- Easily monitor machine conditions, change machine configurations, or upload and download user programs from anywhere, using IDEC WindLDR software over an Ethernet network.
- For a more graphical display and remote data archiving, OPC servers, such as IDEC WindSRV or standard SCADA software, can be used.
- Save time and money:
  -Access system parameters from your desk, conference room or home to check machine status without walking the factory floor.
  -If a machine is down, you no longer need to send someone with their laptop to debug or download a new user program.



Web Server Functions

- Machine status can be monitored and controlled from any PC using standard internet browsers, such as Internet Explorer.
- A built-in custom template, which allows you to monitor and change system parameters, is included.
- Get more flexibility and control by creating your own custom webpage.



Alarm Messaging

Real-time updates of error status or process conditions can be sent to an email address or cellular phone.

- A maximum of 32 customizable messages can be predefined with up to two email addresses each.

O/I Connectivity

- Using the IDEC Web Server Module on an Ethernet network, an IDEC PLC can be configured as a host to an IDEC operator interface. This allows the touchscreen and PLC to be in separate locations.
- No longer hassle with specialized cables and serial connection limitations.

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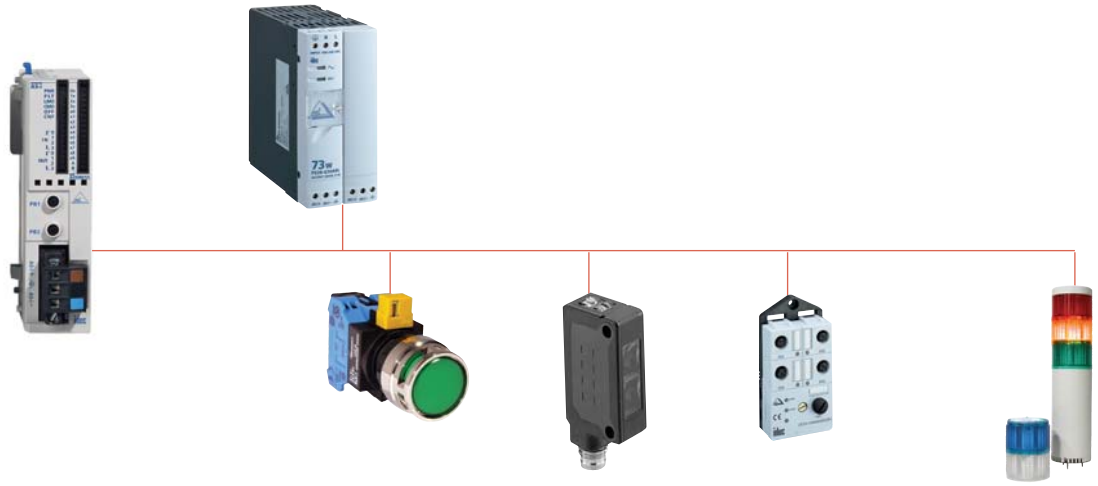
Communication Modules

AS-Interface Module



AS-Interface Master Module

Appearance	Part Number	Description
	FC4A-AS62M	MicroSmart AS-Interface Master Module

The Actuator Sensor-interface (AS-Interface) is the simplest and most cost-effective of the PLC-based , industrial-networking protocols. AS-Interface is a truly open, low-cost electromechanical connection system designed to operate over a two-wire cable carrying data and power over a distance of up to 100m. It is especially suitable for lower levels of plant automation where simple - often binary (On/Off) - field devices such as switches, sensors, and actuators need to interoperate in a local area automation network controlled by a PLC. IDEC supports this open technology.

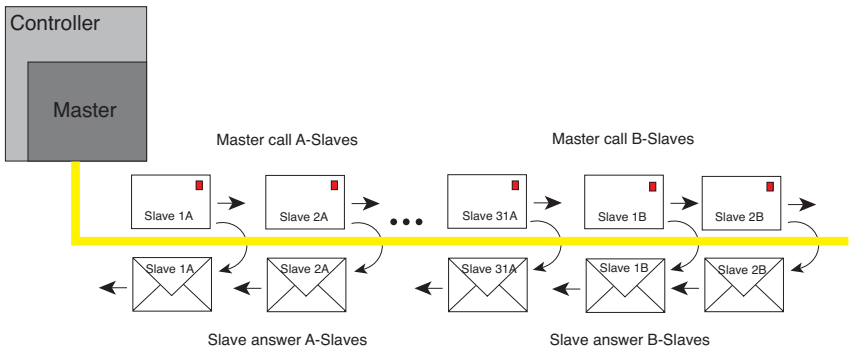
IDEC offers a plug-in AS-Interface master module (as well as other AS-Interface devices, please see AS-Interface Communication section) that is easy to configure; it can also connect up to 62 slaves. With this technology, you'll reduce the amount of engineering needed, simplify wiring and enhance your operations; requiring less maintenance. With an average cost of savings of 15 to 40% compared with traditional cabling methods, using an IDEC AS-Interface module is the easy choice.

Master-Slave Principle

The AS-Interface master controls and monitors the status of slave devices connected to the AS-Interface bus. Normally, the AS-Interface master is connected to a PLC (sometimes called 'host') or a gateway.

Various types of slave devices can be connected to the AS-Interface bus, including sensors, actuators, and remote I/O devices. Analog slaves can also be connected to process analog data. Slaves are available in standard slaves and A/B slaves. Standard slaves have an address of 1 through 31 in the standard address range. A/B slaves have an address of 1A through 31A in the standard address range or 1B through 31B in the expanded address range. Among the A/B slaves, slaves with an address of

1A through 31A are called A slaves, and slaves with an address of 1B through 31B are called B slaves. (see AS-Interface Communication section for more details)



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AS-Interface Module con't

High Reliability and Security
The AS-Interface employs a transfer process of high reliability and high security. The master monitors the AS-Interface power supply voltage and data transmitted on the line, and detects slave failures and data errors. Even when a slave is replaced or a new slave is added during operation, the master can continue uninterrupted communication with other active slaves on the bus.

MicroSmart AS-Interface Master Module — The Right Choice
- Compliant with AS-Interface Ver. 2.1 specifications
- Digital and analog slaves can be connected.
- Configuration and slave monitoring can be done using the LED indicators and pushbuttons on the font panel as well as using WindLDR software.
- Maximum of 2 AS-Interface master modules can be used in the MicroSmart Pentra system.

AS-Interface Bus Topology and Maximum Length
The AS-Interface bus topology is flexible, and you can wire the bus freely according to your requirements. Bus length can be 100m at the maximum.

AS-Interface — The Perfect Solution
- Cost Effective
- Reliable and Safe
- Real-time capable
- Easy to install
- Easy to expand
- Safe against interference
- No limit to the bus structure
- Star, Line or Tree structure can be constructed
- Up to 100m, extendable up to 300m using repeaters

FC5A-SIF2 RS232C Communication Module

Appearance	Part Number	Description
	FC5A-SIF2	RS232 Communication Module for MicroSmart Pentra

Communicate with up to seven different serial devices
Only IDEC offers communication modules that enable you to configure up to seven serial devices! Now you can connect your operator interface, PC, barcode reader, RFID equipment, printer and more. Just imagine the possibilities.

Using the MicroSmart Pentra slim CPU,you can configure up to seven communication ports. Using the All-in-one MicroSmart Pentra you can communicate with up to five serial devices.

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Optional Modules

Appearance	Part Number	Description	Usage
	FC4A-HPH1	HMI Base Module	For mounting HMI module and communication ports with slim model CPU module (HMI module is not included)
	FC4A-PH1	HMI Module	For displaying and changing operands
	FC4A-PM32	EEPROM memory cartridge	32KB EEPROM memory cartridge
	FC4A-PM64	EEPROM memory cartridge	64KB EEPROM memory cartridge
	FC4A-PT1	Clock cartridge	Real-time clock cartridge

Communication Ports

Appearance	Part Number	Description	Terminal
	FC4A-PC1	RS232C	Mini DIN
	FC4A-PC2	RS485	Mini DIN
	FC4A-PC3	RS485	Screw Terminal

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Optional Modules

Communication Module — for Slim CPU

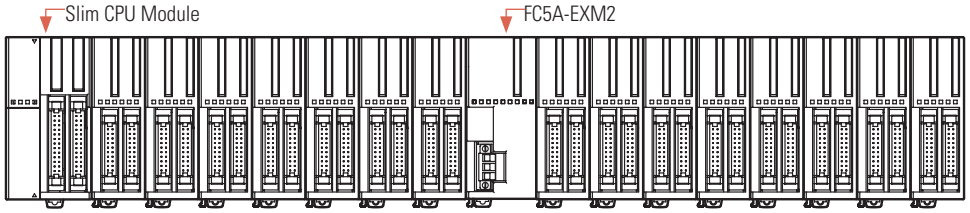
Appearance	Part Number	Description	Terminal
	FC4A-HPC1	RS232C	Mini DIN
	FC4A-HPC2	RS485	Mini DIN
	FC4A-HPC3	RS485	Screw Terminal

Expansion Power Supply Module

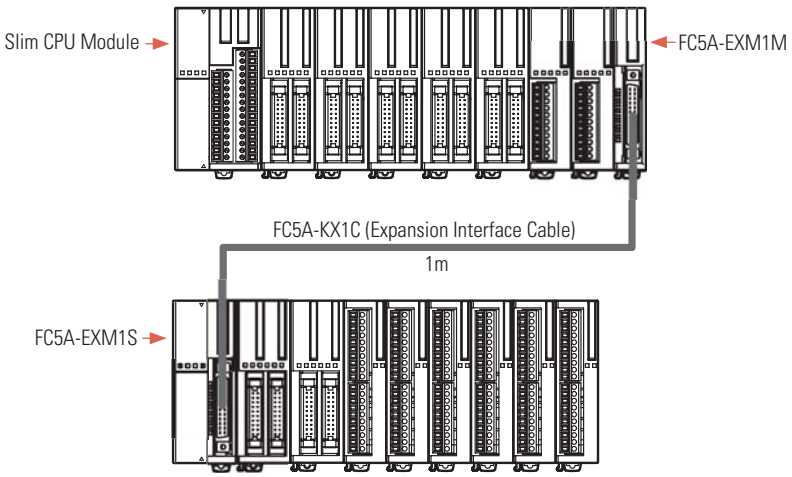
Appearance	Part Number	Description
	FC5A-EXM1M	Master Expansion Power Supply For MicroSmart Pentra
	FC5A-EXM1S	Slave Expansion Power Supply For MicroSmart Pentra
	FC5A-EXM2	Expansion Power Supply For MicroSmart Pentra

Expansion Power Supply System Configuration

FC5A-EXM2 (Expansion Interface Module)



FC5A-EXM1M and FC5A-EXM1S (Expansion Interface Master & Salve Modules)



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Cables

Communication Cables

Appearance	Part Number	Length	Expanded Description
	FC4A-KC4CA	5ft. (1.53m)	Programming cable (Maintenance/User Communication Mode selectable)
	FC4A-USB	6ft. (1.83m)	USB to Serial Converter (for use with PC without serial port)
	FC4A-KC3C	0.33ft. (100mm)	Web Server Module interface cable

Appearance	Part Number	Length	Expanded Description
	FC2A-KM1C	9.84 Ft. (3m)	Modem cable. Used to connect a modem to the MicroSmart RS232C port.
	FC2A-KP1C	9.84 Ft. (3m)	User communication cable. Used to connect RS232C equipment to the MicroSmart RS232C port.
	FC5A-KX1C	3.28 Ft. (1m)	MicroSmart Pentra expansion power supply interface cable. Used to connect expansion interface master and expansion slave modules.

MIL Connector Cables (use with Breakout Modules)

Use with	Part Number	Model	Length
CPU Module (26-wire) BX1D-S26A, BX1D-T26A	FC9Z-H050B26	Non-shielded	1.64ft. (0.5m)
	FC9Z-H100B26		3.28ft. (1m)
	FC9Z-H200B26		6.56ft (2m)
	FC9Z-H300B26		9.85ft. (3m)
	FC9Z-H050A26	Shielded	1.64ft. (0.5m)
	FC9Z-H100A26		3.28ft. (1m)
	FC9Z-H200A26		6.56ft (2m)
	FC9Z-H300A26		9.85ft. (3m)
	FC9Z-H100C26A	Shielded Single Connectors	5ft. (1.5m)

Use with	Part Number	Model	Length
I/O Expansion Modules (20-wire) BX1D-S20A, BX1D-T20A	FC9Z-H050B20	Non-shielded	1.64ft. (0.5m)
	FC9Z-H100B20		3.28ft. (1m)
	FC9Z-H200B20		6.56ft (2m)
	FC9Z-H300B20		9.85ft. (3m)
	FC9Z-H050A20	Shielded	1.64ft. (0.5m)
	FC9Z-H100A20		3.28ft. (1m)
	FC9Z-H200A20		6.56ft (2m)
	FC9Z-H300A20		9.85ft. (3m)
	FC9Z-H100C20A	Shielded Single Connectors	5ft. (1.5m)

Breakout Modules

Use with	Part Number	Descrption
26-wire MIL connector cable	BX1D-S26A	26-terminal breakout module
	BX1D-T26A	26-terminal touch-down terminal breakout module
20-wire MIL connector cable	BX1D-S20A	20-terminal breakout module
	BX1D-T20A	20-terminal touch-down terminal breakout module

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Accessories

Part Number	Use with	Description
FC4A-PMT13P	CPU module	13-position left-side terminal block for FC4A-D20RK1/-D20RS1 CPU
FC5A-PMT13P		13-position left-side terminal block for FC5A-D16RK1/-D16RS1 CPU
FC4A-PMTS16P		16-position right-side terminal block for FC4A-D20RS1 and FC5A-D16RS1 CPU
FC4A-PMTK16P		16-position right-side terminal block for FC4A-D20RK1 and FC5A-D16RK1 CPU
FC4A-PMT11P	I/O expansion modules	11-position terminal block for 8-pt I/O expansion modules
FC4A-PMT10P		10-position terminal block for 16-pt I/O expansion modules
FC4A-PMC20P		20-position connector socket for MIL connector I/O expansion modules
FC4A-PMC26P		26-position connector socket for MIL connector CPU modules
FC4A-PSP1P		Direct mounting strips for mounting on a panel
FC4A-PMAC2P		Analog voltage input cable for slim CPU
FC4A-DS824-SW14		14-pt input simulator switch for 24 I/O CPU
FC4A-DS824-SW9		9-pt input simulator switch for 16 I/O CPU
FC4A-DS824-SW6		6-pt input simulator switch for 10 I/O CPU
BNL6		End clips
BNDN1000		DIN Rail (1m/3.28' long, 10.5mm height)
BAA1000		DIN Rail (1m/3.28' long, 7.5mm height)
FC9Z-SD2		2.5mm flathead IDEC screwdriver
FC9Y-B812-0A		MicroSmart user manual
FC9Y-B927-0		MicroSmart Pentra user manual
FC9Y-B919		Web Server Module user manual
FC9Y-B969-0		FC5A-SIF2 Communication Module user manual
FC9Y-B902-0		Analog I/O user manual
FC9Y-LP2CDW		WindLDR PLC programming software

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Starter Kits and Solution Packages

MicroSmart Starter Kits

		Part Numbers	Controller	Power Supply	Software (Prog. Cables Included)
MicroSmart		MM-SMART-10	10 I/O All-in-One CPU	–	WindLDR
		MM-SMART-16	16 I/O All-in-One CPU	–	WindLDR
		MM-SMART-20	20 I/O Slim CPU	15W	WindLDR
		MM-SMART-24	24 I/O All-in-One CPU	–	WindLDR
		MM-SMART-40	40 I/O Slim CPU	15W	WindLDR
MicroSmart Pentra		MM-PENTRA-16	16 I/Os Slim CPU	30W	WindLDR
		MM-PENTRA-24	24 I/Os All-in-One CPU	–	WindLDR

MicroSmart Solution Packages

		Part Numbers	Operator Interface*	Controller	Power Supply
MicroSmart		MM-SMART-16-HG2F-M	HG2F 5.7" Mono STN	16 I/O All-in-One CPU	15W
		MM-SMART-20-HG2F-M	HG2F 5.7" Mono STN	20 I/O Slim CPU	60W
		MM-SMART-24-HG2F-M	HG2F 5.7" Mono STN	24 I/O All-in-One CPU	15W
		MM-SMART-40-HG2F-M	HG2F 5.7" Mono STN	40 I/O Slim CPU	60W
		MM-SMART-16-HG2F-C	HG2F 5.7" Color STN	16 I/O All-in-One CPU	15W
		MM-SMART-20-HG2F-C	HG2F 5.7" Color STN	20 I/O Slim CPU	60W
		MM-SMART-24-HG2F-C	HG2F 5.7" Color STN	24 I/O All-in-One CPU	15W
		MM-SMART-40-HG2F-C	HG2F 5.7" Color STN	40 I/O Slim CPU	60W
		MM-SMART-20-HG3F	HG3F 10.4" Color TFT	20 I/O Slim CPU	60W
		MM-SMART-24-HG3F	HG3F 10.4" Color TFT	24 I/O All-in-One CPU	60W
		MM-SMART-20-HG4F	HG4F 12.1" Color TFT	20 I/O Slim CPU	60W
		MM-SMART-24-HG4F	HG4F 12.1" Color TFT	24 I/O All-in-One CPU	60W
MicroSmart Pentra		MM-PENTRA-16-HG1F	HG1F 4.6" Mono STN	16 I/O Slim CPU	30W
		MM-PENTRA-24-HG1F	HG1F 4.6" Mono STN	24 I/O All-in-One CPU	30W
		MM-PENTRA-16-HG2F-C	HG2F 5.7" Color STN	16 I/O Slim CPU	30W
		MM-PENTRA-24-HG2F-C	HG2F 5.7" Color STN	24 I/O All-in-One CPU	30W
		MM-PENTRA-16-HG3F	HG3F 10.4" Color TFT	16 I/O Slim CPU	30W
		MM-PENTRA-24-HG3F	HG3F 10.4" Color TFT	24 I/O All-in-One CPU	30W
		MM-PENTRA-16-HG4F	HG4F 12.1" Color TFT	16 I/O Slim CPU	30W
		MM-PENTRA-24-HG4F	HG4F 12.1" Color TFT	24 I/O All-in-One CPU	30W

1. *HG1F: Light Gray Bezel, RS232 Comm., HG2F/3F/4F: Light Gray Bezel.
2. All packages come with WindLDR & WindO/I-NV2 software, programming and interface cables.

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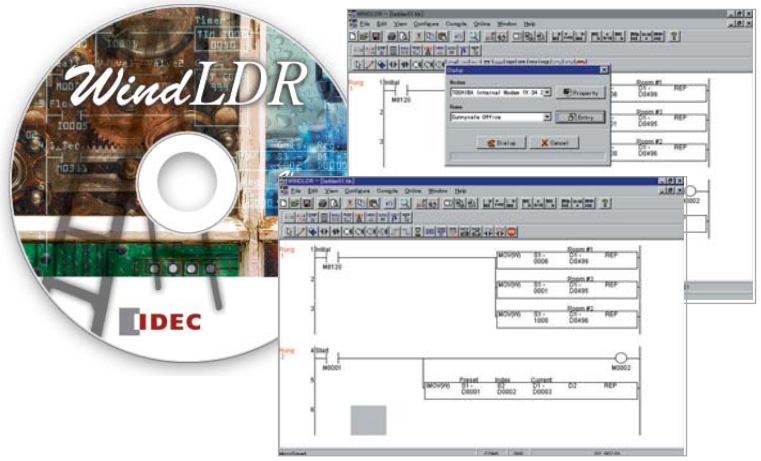
WindLDR

Programming Software

Unique ladder logic programming tool designed to program all IDEC PLCs



Part Number

Part Number	Description
FC9Y-LP2CDW	WindLDR PLC programming software

Single Platform for all IDEC PLCs

WindLDR is an excellent, long-term investment for your control solutions. It programs every IDEC PLC including the OpenNet Controller, MicroSmart and the fastest micro-controller on the market, MicroSmart Pentra. It's adaptable to whatever hardware you need today and down the road.

User-friendly Interfaces

Icon-based toolbars and drag-and-drop functionality make basic ladder programming accessible to anyone. But WindLDR also shows you how to display parameters and settings and how to input your parameters, and the built-in shortcuts and tutorials will keep you on the right track.

Simple-to-use Editors

Use the tag editor to access and edit coil data. Edit comments and rung comments. Simulation mode tests your program in WindLDR to guarantee that it works the way you expected, before downloading it to your PLC.

Free Lifetime Upgrade

Not only is WindLDR the easiest and most convenient ladder programming software on the market, it also comes with a very special price with no strings attached. Our software comes with a free-lifetime upgrade. That means that you no longer need to spend thousands of dollars for software that has to be renewed every year costing you additional money. Save yourself money by using an IDEC PLC and WindLDR programming software.

For more information, see the Automation Software section.

Visit **www.idec.com/downloads** for free upgrades or a free 30-day trial version.

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Specifications

All-in-One

Part Number	AC Power	FC5A-C10R2	FC5A-C16R2	FC5A-C24R2	FC4A-C10R2	FC4A-C16R2	FC4A-C24R2
	DC Power	FC5A-C10R2C	FC5A-C16R2C	FC5A-C24R2C	FC4A-C10R2C	FC4A-C16R2C	FC4A-C24R2C
Rated Voltage		AC power model: 100 to 240V AC, DC power model: 24V DC					
Allowable Voltage Range		AC power model: 85 to 264V AC, DC power model: 20.4 to 28.8V DC (including ripple)					
Rated Power Frequency		AC power model: 50/60 Hz (47 to 63 Hz)					
Maximum Input Current		250mA (85V AC) 160mA (24V DC)	300mA (85V AC) 190mA (24V DC)	450mA (85V AC) [1] 360mA (24V DC) [2]	250mA (85V AC) 160mA (24V DC)	300mA (85V AC) 190mA (24V DC)	450mA (85V AC) [2] 360mA (24V DC) [3]
Maximum Power Consumption	AC Power	FC5A-C10R2/FC4A-C10R2: 30VA (264V AC) / 20VA (100V AC) [3] FC5A-C16R2/FC4A-C16R2: 31VA (264 V AC) / 22VA (100V AC) [3] FC5A-C24R2/FC4A-C24R2: 40VA (264V AC) / 33VA (100V AC) [1]					
	DC Power	FC5A-C10R2C/FC4A-C10R2C: 3.9W (24V DC) [4] FC5A-C16R2C/FC4A-C16R2C: 4.6W (24V DC) [4] FC5A-C24R2C/FC4A-C24R2C: 8.7W (24V DC) [2]					
Allowable Momentary Power Interruption		10ms (rated power voltage)					
Dielectric Strength		Between power and ⏚ or ⏥ terminals: 1500V AC, 1 minute Between I/O and ⏚ or ⏥ terminals: 1500V AC, 1 minute					
Insulation Resistance		Between power and ⏚ or ⏥ terminals: 10 MΩ minimum (500V DC megger) Between I/O and ⏚ or ⏥ terminals: 10 MΩ minimum (500V DC megger)					
Noise Resistance		AC power terminals: 1.5 kV, 50 ns to 1µs DC power terminals: 1.0 kV, 50 ns to 1µs I/O terminals (coupling clamp): 1.5 kV, 50 ns to 1µs					
Inrush Current		35A		40A	35A		40A
Power Supply Wire		UL1015 AWG22, UL1007 AWG18					
Operating Temperature		0 to 55ºC					
Storage Temperature		–25 to +70ºC (no freezing)					
Relative Humidity		Level RH1 (IEC61131-2), 1 to 95% RH (no condensation)					
Altitude		Operation: 0 to 2,000m, Transport: 0 to 3,000m					
Pollution Degree		2 (IEC60664-1)					
Corrosion Immunity		Free from corrosive gases					
Degree of Protection		IP20 (IEC60529)					
Grounding Wire		UL1007, AWG16					
Vibration Resistance		When mounted on a DIN rail or panel surface: 5 to 9 Hz amplitude 3.5 mm, 9 to 150 Hz acceleration 9.8 m/s^2 (1G), 2 hours per axis on each of three mutually perpendicular axes (IEC61131-2)					
Shock Resistance		147 m/s^2 (15G), 11ms duration, 3 shocks per axis, on three mutually perpendicular axes (IEC61131)					
Weight		AC: 230g DC: 240g	AC: 250g DC: 260g	AC: 305g DC: 310g	AC: 230g DC: 240g	AC: 250g DC: 260g	AC: 305g DC: 310g

1. CPU module (including 250mA sensor power) + 4 I/O modules
2. CPU module + 4 I/O modules
3. CPU module (including 250mA sensor power)
4. CPU module (24V DC)

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Slim

Part Number			FC5A-D16RK1 FC5A-D16RS1	FC5A-D32K3 FC5A-D32S3	FC4A-D20K3 FC4A-D20S3	FC4A-D20RK1 FC4A-D20RS1	FC4A-D40K3 FC4A-D40S3
Control System			Stored program system				
Instruction Words			35 basic				
			88 advanced	92 advanced	55 advanced	72 advanced	
Program Capacity [1]			62.4 KB (10,400 steps)		27 KB (4,500 steps)	31.2 KB (5,200 steps) [2]	
User Program Storage			EEPROM (10,000 times rewritable)				
Processing Time		Basic Instruction	83µs (1,000 steps)		1.65ms (1,000 steps)		
		END Processing [3]	0.35ms		0.64ms		
Expandable I/O Modules			7 modules + additional 8 modules using the expansion power supply module		7 modules		
I/O Points		Input	8 Expansion: 224	16 Expansion: 224	12 Expansion: 128	12 Expansion: 224	24 Expansion: 224
		Output	8 Additional: 256	16 Additional: 256	8	8	16
Internal Relay			2,048 points		1,024 points		
Shift Register			256 points		128 points		
Data Register			42,000 points [4]		1,300 points		
Expansion Data Register			6,000 points		—	6,000 points	
Counter			256 points		100 points		
Timer (1-sec, 100-ms, 10-ms, 1-ms)			256 points		100 points		
RAM Backup		Backup Data	Internal relay, shift register, counter, data register, expansion data register				
		Backup Duration	Approx. 30 days (typical) at 25°C after backup battery fully charged				
		Battery	Lithium secondary battery				
		Charging Time	Approx. 15 hours for charging from 0% to 90% of full charge				
		Battery Life	5 years				
		Replaceability	N/A				
Self-diagnostic Function			Power failure, watchdog timer, data link connection, user program EPPROM sum check, timer/counter preset value sum check, user program RAM sum check, keep data, user program syntax, user program writing, CPU module, clock IC, I/O bus initialize, user program execution				
Input Filter			Without filter or 3 to 15ms filter (selectable in increments of 1ms)				
Catch Input/Interrupt Input			Four inputs (I2 through I5) Minimum turn on pulse width: 5µs minimum Minimum turn off pulse width: 5µs minimum		Four inputs (I2 through I5) Minimum turn on pulse width: 40µs minimum Minimum turn off pulse width: 150µs minimum		
High-speed Counter		Maximum Counting Frequency and High-speed Counter Points	Total 4 points Single/two-phase selectable: 100 KHz (2 points) Single-phase:100 KHz (2 points)		Total 4 points Single/two-phase selectable: 20 KHz (2 points) Single-phase: 5 KHz (2 points)		
		Counting Range	0 to 4294967295 (32 bits)		0 to 65535 (16 bits)		
		Operation Mode	Rotary encoder mode and adding counter mode				
Analog Potentiometer		Number	1 point				
		Data Range	0 to 255				
Analog Voltage Input		Number	1 point				
		Input Voltage Range	0 to 10V DC				
		Input Impedance	Approx. 100kΩ				
		Data Range	0 to 255 (8 bits)				
Pulse Output		Number	2 points	3 points	2 points		
		Maximum Frequency	100KHz		20KHz		
Sensor Power Supply		Output Voltage Current	—				
		Overload Detection					
		Isolation					
Port 1			RS232C (maintenance communication, user communications)				
Port 2 Communication Adapter (option) [5]			Possible	Possible	Possible	Possible	Possible
Clock Cartridge (option)			Possible	Possible	Possible	Possible	Possible
Memory Cartridge (option)			Possible	Possible	Possible	Possible	Possible
HMI Module (option)			Possible	Possible	Possible	Possible	Possible

1. 1 step equals 6 bytes.
2. Expandable up to 64 KB when a memory cartridge is used.
3. Not including expansion I/O service time, clock function processing time, data link processing time, and interrupt processing time.
4. Extra data registers D10000 through D49999 are enabled using WindLDR Function Area Settings, then run-time program download cannot be used.
5. Maintenance communication, user communication, Modem communication, data link, Modbus master/slave communication (FC5A only).

Note: The maximum number of relay outputs that can be turned on simultaneously is 54 including those on the CPU module.

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All-in-One

Part Number			FC5A-C10R2 FC5A-C10R2C	FC5A-C16R2 FC5A-C16R2C	FC5A-C24R2 FC5A-C24R2C	FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C
Control System			Stored program system					
Instruction Words			35 basic					
			76 advanced	76 advanced	81 advanced	38 advanced	40 advanced	46 advanced
Program Capacity [1]			13.8 KB (2,300 steps)	27 KB (4,500 steps)	54 KB (9,000 steps)	4.8 KB (800 steps)	15 KB (2,500 steps)	27 KB (4,500 steps)
User Program Storage			EEPROM (10,000 times rewritable)					
Processing Time	Basic Instruction		1.16ms (1,000 steps)			1.65ms (1,000 steps)		
	END Processing [2]		0.64ms			0.64ms		
Expandable I/O Module			—		4 modules	—		4 modules
I/O Points	Input		6	9	14	6	9	14
	Output		4	7	10	4	7	10
					Expansion: 64			Expansion: 64
Internal Relay			2,048 points			256 points	1,024 points	
Shift Register			128 points			64 points	128 points	
Data Register			2,000 points			400 points	1,300 points	
Extra Data Register			—			—		
Counter			256 points			32 points	100 points	
Timer (1-sec, 100-ms, 10-ms, 1-ms)			256 points			32 points	100 points	
RAM Backup	Backup Data		Internal relay, shift register, counter, data register					
	Backup Duration		Approx. 30 days (typical) at 25°C after backup battery fully charged					
	Battery		Lithium secondary battery					
	Charging Time		Approx. 15 hours for charging from 0% to 90% of full charge					
	Battery Life		5 years					
	Replaceability		N/A					
Self-diagnostic Function			Power failure, watchdog timer, data link connection, user program EPPROM sum check, timer/counter preset value sum check, user program RAM sum check, keep data, user program syntax, user program writing, CPU module, clock IC, I/O bus initialize, user program execution					
Input Filter			Without filter or 3 to 15ms filter (selectable in increments of 1ms)					
Catch Input/Interrupt Input			Four inputs (I2 through I5) Minimum turn on pulse width: 40µs minimum Minimum turn off pulse width: 150µs minimum					
High-speed Counter	Maximum Counting Frequency and High-speed Counter Points		Total 4 points Single/two-phase selectable: 50KHz (1 point) Single-phase: 5KHz (3 points)			Total 4 points Single/two-phase selectable: 20KHz (1 point) Single-phase: 5KHz (3 points)		
	Counting Range		0 to 65535 (16 bits)					
	Operation Mode		Rotary encoder mode and adding counter mode					
Analog Potentiometer	Number		1 point		2 points	1 point		2 points
	Data Range		0 to 255					
Analog Voltage Input	Number		—					
	Input Voltage Range							
	Input Impedance							
	Data Range							
Pulse Output	Number		—					
	Max. Frequency							
Sensor Power Supply (AC Power Only)	Output Voltage Current		24V DC (+10% to -15%), 250mA					
	Overload Detection		N/A					
	Isolation		Isolated from the internal circuit					
Port 1			RS232C (maintenance communication, user communication)					
Port 2 Communication Adapter (option) [3]			Possible	Possible	Possible	—	Possible	Possible
Clock Cartridge (option)			Possible	Possible	Possible	Possible	Possible	Possible
Memory Cartridge (option)			Possible	Possible	Possible	Possible	Possible	Possible
HMI Module (option)			Possible	Possible	Possible	Possible	Possible	Possible

1. 1 step equals 6 bytes.
2. Not including expansion I/O service time, clock function processing time, data link processing time, and interrupt processing time.
3. Maintenance communication, user communication, Modem communication, datalink, Modbus master/slave communication (FC5A only).

Note: The maximum number of relay outputs that can be turned on simultaneously is 33 including those on the CPU module.

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Communication Port (RS232C Port 1)

Model	Slim CPU	All-in-One CPU
Standards	EIA RS232C	
Maximum Baud Rate	FC5A: 57,600 bps (maintenance communication) FC4A: 19,200 bps (maintenance communication)	
Maintenance Communication	Possible	
User Communication	Possible	
Modem Communication	N/A	
Data Link	N/A	
Cable	Special cable (FC2A-KC4C, FC2A-KP1C, FC4A-KC1C, FC4A-KC2C)	
Isolation between Internal Circuit and Communication Port	Not isolated	

Input Specifications

Part Number	–	FC5A-D16RK1 FC5A-D16RS1	–	FC5A-D32K3 FC5A-D32S3	–	FC5A-C10R2 FC5A-C10R2C	FC5A-C16R2 FC5A-C16R2C	FC5A-C24R2 FC5A-C24R2C
	FC4A-D20K3 FC4A-D20S3	–	FC4A-D20RK1 FC4A-D20RS1	–	FC4A-D40K3 FC4A-D40S3	FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C
Input Points	12 (12/1 common)	8 (8/1 common)	12 (12/1 common)	16 (8/1 common)	24 (12/1 common)	6 (6/1 common)	9 (9/1 common)	14 (14/1 common)
Input Voltage	24V DC sink/source input signal							
Input Voltage Range	20.4 to 26.4V DC					20.4 to 28.8V DC		
Input Current	FC5A I0, I1, I3, I4, I6, I7: 4.5mA/point (24V DC) I2, I5, I10 to I17: 7mA/point (24V DC) FC4A I0, I1, I6, I7: 5mA/point (24V DC) I2 to I5, I10 to I27: 7mA/point (24V DC)					FC5A I0 and I1: 6.4mA/point I2 to I7, I10 to I15: 7mA/point (24V DC) FC4A I0 and I1: 11mA I2 to I7, I10 to I15: 7mA/point (24V DC)		
Input Impedance	FC5A I0, I1, I3, I4, I6, I7: 4.9kΩ I2 to I5, I10 to I17: 3.4kΩ FC4A I0, I1, I6, I7: 5.7kΩ I2 to I5, I10 to I17: 3.4kΩ					FC5A I0 and I1: 3.7kΩ I2 to I7, I10 to I15: 3.4kΩ FC4A I0 and I1: 2.1kΩ I2 to I7, I10 to I15: 3.4kΩ		
Turn ON Time	FC5A I0, I1, I3, I4, I6, I7: 5µs + filter value I2 and I5: 35µs + filter value I10 to I17: 40µs + filter value FC4A I0, I1, I6, I7: 35µs + filter value I2 to I5: 35µs + filter value I10 to I27: 40µs + filter value					FC5A I0 and I1: 2µs + filter value I2 to I7: 35µs + filter value I6, I7, I10 to I15: 40µs + filter value FC4A I0 and I1: 35µs + filter value I2 to I5: 35µs + filter value I6, I7, I10 to I15: 40µs + filter value		
Turn OFF Time	FC5A I0, I1, I3, I4, I6, I7: 5µs + filter value I2 and I5: 150µs + filter value I10 to I17: 150µs + filter value FC4A I0, I1, I6, I7: 45µs + filter value I2 to I5: 150µs + filter value I10 to I27: 150µs + filter value					FC5A I0 and I1: 16µs + filter value I2 to I7: 150µs + filter value I6, I7, I10 to I15: 150µs + filter value FC4A I0 and I1: 45µs + filter value I2 to I5: 150µs + filter value I6, I7, I10 to I15: 150µs + filter value		
Connector — On Mother Board	FL26A2MA (Oki Electric Cable)	MC1.5/18-G-3.81BK (Phoenix Contact)		FL26A2MA (Oki Electric Cable)		—		
Connector — Insertion Durability	100 times minimum					—		
Isolation	Between input terminals: Photocoupler isolated Internal circuit: Not isolated							
Input	Type 1 (IEC61131-2)							
External Load for I/O Interconnection	Not needed							
Single Determination Method	Static							
Effect of Improper Input Connection	Both sinking and sourcing input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused.							
Cable Length	3 m in compliance with electromagnetic immunity							

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Transistor Sink and Source Output

Part Number		—	FC5A-D16RK1 FC5A-D16RS1	FC5A-D32K3 FC5A-D32S3
		FC4A-D20RK1 FC4A-D20RS1	—	FC4A-D40K3 FC4A-D40S3
Output Points		2 (2/1 common)	2 (2/1 common)	16 (8/1 common)
Output	Transistor Sink	FC5A-D16K1/D32K3 FC4A-D20K3/D20RK1/D40K3		
	Transistor Source	FC5A-D16RS1/D32S3 FC4A-D20S3/D20RS1/D40S3		
Load Voltage		24V DC		
Operating Load Voltage Range		20.4 to 28.8V DC		
Load Current		0.3A per output point		
Maximum Load Current		1A per common		
Voltage Drop (ON Voltage)		1V maximum (voltage between COM and output terminals when output is on)		
Inrush Current		1A		
Leakage Current		0.1mA maximum		
Clamping Voltage		39V±1V		
Maximum Lamp Load		8W		
Inductive Load		L/R = 10ms (28.8V DC, 1 Hz)		
External Current Draw		Sink output: 100mA maximum, 24V DC (power voltage at the +V terminal) Source output: 100mA maximum, 24V DC (power voltage at the –V terminal)		
Isolation		Between output terminal and internal circuit: Photocoupler isolated Between output terminals: Not isolated		
Connector on Mother Board		FL26A2MA (Oki Electric Cable)	MC1.5/16-G-3.81BK (Phoenix Contact)	FL26A2MA (Oki Electric Cable)
Connector Insertion/ Removal Durability		100 times minimum		
Output Delay	Turn ON Time	FC5A Q0 to Q2: 5µs max. Q3 to Q7, Q10 to Q17: 300µs max. FC4A Q0, Q1: 5µs max. Q2 to Q7, Q10 to Q17: 300µs max.		
	Turn OFF Time	FC5A Q0 to Q2: 5µs max. Q3 to Q7, Q10 to Q17: 300µs max. FC4A Q0, Q1: 5µs max. Q2 to Q7, Q10 to Q17: 300µs max.		

Relay Output

Part Number		FC5A-C10R2 FC5A-C10R2C	FC5A-C16R2 FC5A-C16R2C	FC5A-C24R2 FC5A-C24R2C	FC5A-D16RK1 FC5A-D16RS1
		FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C	FC4A-D20RK1 FC4A-D20RS1
No. of Outputs		4	7	10	8
Output Points per Common Line	COM0	3	4	4	2 (Transistor output)
	COM1	1	2	4	3
	COM2	—	1	1	2
	COM3	—	—	1	1
Output		1 NO form A			
Maximum Load Current		2A per point 8A per common line			
Minimum Switching Load		0.1mA/0.1V DC (reference value)			
Initial Contact Resistance		30 mΩ maximum			
Electrical Life		100,000 operations minimum (rated load 1,800 operations/hour)			
Mechanical Life		20,000,000 operations minimum (no load 18,000 operations/hour)			
Rated Load		240V AC/2A (resistive load, inductive load cos ø = 0.4) 30V DC/2A (resistive load, inductive load L/R =7ms)			
Dielectric Strength		Between output and ⏚ terminals: 1,500V AC, 1 minute Between output terminal and internal circuit: 1,500V AC, 1 minute Between output terminals (COMs): 1,500V AC, 1 minute			
Connector on Mother Board		—			*
Connector Insertion/Removal Durability		—			100 times minimum

*MC1.5/16-G-3.81BK (Phoenix Contact)

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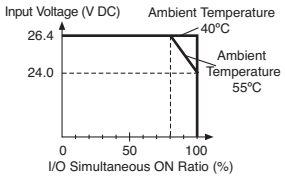
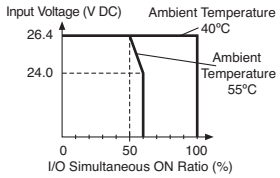
Input Usage Limits

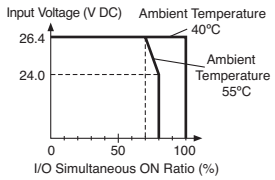
FC5A-D16RK1/D16RS1



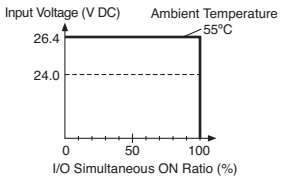
FC5A-D32K3/D32S3
FC4A-D40K3/D40S3



FC4A-D20K3/D20S3

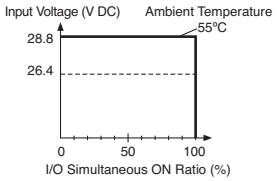


FC4A-D20RK1/D20RS1

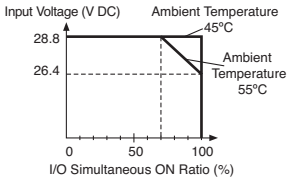


All-in-One CPU

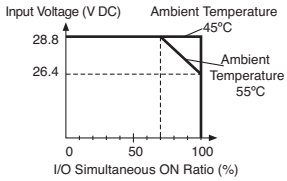
FC5A-C10R2
FC5A-C10R2C
FC4A-C10R2
FC4A-C10R2C



FC5A-C16R2
FC5A-C16R2C
FC4A-C16R2
FC4A-C16R2C



FC5A-C24R2
FC5A-C24R2C
FC4A-C24R2
FC4A-C24R2C

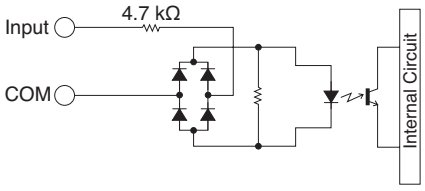


CAUTION: When using at an operating ambient temperature above 40°C, reduce the input voltage or the quantity of I/O points that turn on simultaneously.

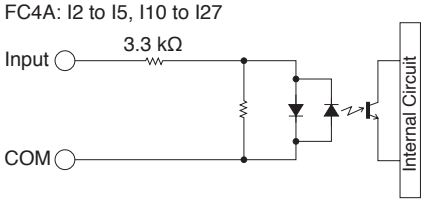
Input Internal Circuit

Slim CPU

FC5A: I0, I1, I3, I4, I6, I7
FC4A: I0, I1, I6, I7

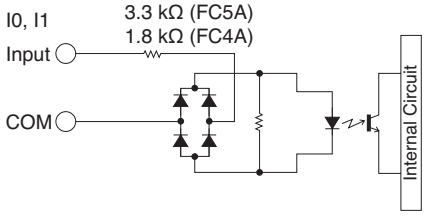


FC5A: I2, I5, I10 to I17
FC4A: I2 to I5, I10 to I27

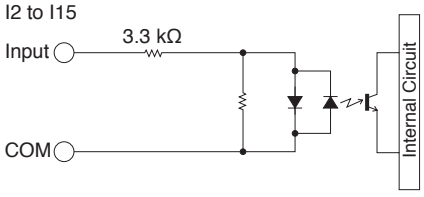


All-in-One CPU

I0, I1



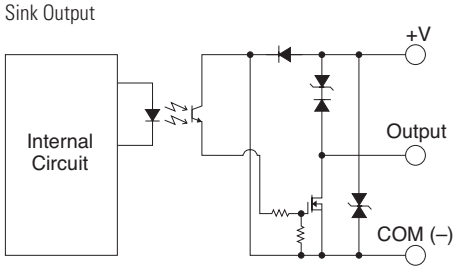
I2 to I15



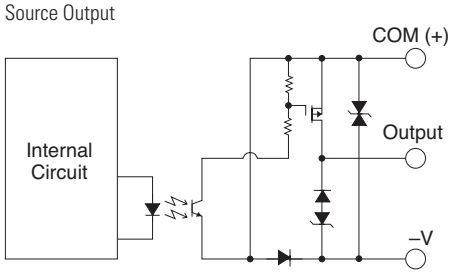
Output Internal Circuit

Slim CPU

Sink Output



Source Output



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Communication Adapter/Module

Part Number	FC4A-PC1 FC4A-HPC1	FC4A-PC2 FC4A-HPC2	FC4A-PC3 FC4A-HPC3
Standards	EIA RS232C	EIA RS485	EIA RS485
Maximum Baud Rate	FC5A: 57600bps FC4A: 19200bps	FC5A: 57600bps FC4A: 19200bps	FC5A: 57600bps FC4A: 19200bps (38400 bps [1])
Maintenance Communication	Possible	Possible	Possible
User Communication	Possible	—	Possible [2]
Data Link Communication	—	—	Possible
Half-duplex Communication	—	—	Possible
Maximum Cable Length	Special cable [3]	Special cable [4]	200 m
Quantity of Slave Stations	—	—	31
Isolation between Internal Circuit and Communication Port	Not isolated		
Recommended Cable for RS485	—		Twisted-pair shielded cable with a minimum core wire of 0.3 mm²
Conductor Resistance			85Ω/km maximum
Shield Resistance			20Ω/km maximum

1. Maximum speed when data link is used.
2. FC5A (all types), FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, FC4A-D40S3
3. FC2A-KC4C, FC2A-KM1C, FC4A-KC1C, FC4A-KC2C, FC2A-KP1C
4. FC2A-KP1C

HMI Module (Optional)

Part Number	FC4A-PH1
Power Voltage	5V DC (supplied from the CPU module)
Weight	20g

Memory Cartridge Specifications (Optional)

Part Number	FC4A-PM32	FC4A-PM64
Memory	EEPROM	
Accessible Memory Capacity	32 KB	64 KB
Hardware for Storing Data	CPU Module	
Software for Storing Data	WindLDR	
Quantity of Stored Programs	One user program can be stored on one memory cartridge	

Clock Cartridge (Optional)

Part Number	FC4A-PT1
Accuracy	±30 sec/month (typical) at 25°C
Backup Duration	Approx. 30 days (typical) at 25°C after backup battery fully charged
Battery	Lithium secondary battery
Charging Time	Approx. 10 hours for charging from 0% to 90% of full charge
Replaceability	N/A

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I/O Modules Specifications

Input Module

Part Number		FC4A-N08B1	FC4A-N16B1	FC4A-N16B3	FC4A-N32B3	FC4A-N08A11
Input Points		8 (8/1 common)	16 (16/1 common)		32 (16/1 common)	8 (4/1 common)
Input Voltage		24V DC sink/source input signal				100 to 120V AC (50/60 Hz)
Input Voltage Range		20.4 to 28.8V DC				85 to 132V AC
Input Current		7mA/point (24V DC)		5mA/point (24V DC)		17mA/point (120V AC, 60 Hz)
Input Impedance		3.4kΩ		4.4kΩ		0.8kΩ (60 Hz)
ON Voltage		15V minimum				9V minimum
OFF Voltage		5V maximum				20V maximum
ON Current		4.2mA minimum (at 15V DC)		3.2mA minimum (at 15V DC)		—
OFF Current		1.2mA maximum		0.9mA maximum		—
Turn ON Time		4ms				25ms
Turn OFF Time		4ms				30ms
Isolation		Between input terminals: Not isolated Internal circuit: Photocoupler isolated				Between input terminals in the same common: Not isolated Between input terminals in different commons: Isolated Between input terminals and internal circuits: Photocoupler isolated
External Load for I/O Interconnection		Not needed				Not needed
Single Determination Method		Static				Static
Effect of Improper Input Connection		Both sink and source input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused.				If any input exceeding the rated value is applied, permanent damage may be caused.
Cable Length		3m in compliance with electromagnetic immunity				—
Connector on Mother Board		MC1.5/10-G-3.81BK (Phoenix Contact)		FL26A2MA (Oki Electric Cable)		MC1.5/10-G-3.81BK (Phoenix Contact)
Connector Insertion/ Removal Durability		100 times minimum				
Applicable Ferrule		1-wire: A1 0.5-8 WH 2-wire: A1-TWIN 2×0.5-8 WH		—		—
Internal Current Draw	All Inputs ON	25mA (5V DC)	40mA (5V DC)	35mA (5V DC)	65mA (5V DC)	60mA (5V DC), 0mA (24V DC)
	All Inputs OFF	5mA (5V DC)	5mA (5V DC)	5mA (5V DC)	10mA (5V DC)	30mA (5V DC), 0mA (24V DC)
Internal Power Consumption (at 24V DC while all inputs ON)		0.17W	0.27W	0.24W	0.44W	—
Weight		85g	100g	65g	100g	80g

Transistor Output Modules

Part Number		FC4A-T08K1 FC4A-T08S1	FC4A-T16K3 FC4A-T16S3	FC4A-T32K3 FC4A-T32S3
Output Points		8 (8/1 common)	16 (16/1 common)	32 (16/1 common)
Output		FC4A-T®K®: Transistor sink output FC4A-T®S®: Transistor source output		
Load Voltage		24V DC		
Operating Load Voltage Range		20.4 to 28.8V DC		
Maximum Load Current		0.3A per point	0.1A per point	
		3A per common	1A per common	
Voltage Drop (ON Voltage)		1V maximum (voltage between COM and output terminals when output is on)		
Inrush Current		1A maximum		
Clamping Voltage		39V±1V		
Maximum Lamp Load		8W		
Inductive Load		L/R = 10ms (28.8V DC)		
External Current Draw		FC4A-T®K®: 100mA maximum, 24V DC (power voltage at the +V terminal) FC4A-T®S®: 100mA maximum, 24V DC (power voltage at the –V terminal)		
Isolation		Between output terminal and internal circuit: Photocoupler isolated Between output terminals: Not isolated		

Part Number		FC4A-T08K1 FC4A-T08S1	FC4A-T16K3 FC4A-T16S3	FC4A-T32K3 FC4A-T32S3
Connector on Mother Board		MC1.5/10-G-3.81BK (Phoenix Contact)	FL26A2MA (Oki Electric Cable)	
Connector Insertion/ Removal Durability		100 times minimum		
Applicable Ferrule		1-wire: A1 0.5-8 WH 2-wire: A1-TWIN 2×0.5-8 WH		
Internal Current Draw	All outputs ON	10mA (5V DC) 20mA (24V DC)	10mA (5V DC) 40mA (24V DC)	20mA (5V DC) 70mA (24V DC)
	All outputs OFF	5mA (5V DC) 0mA (24V DC)	5mA (5V DC) 0mA (24V DC)	10mA (5V DC) 0mA (24V DC)
Internal Power Consumption (at 24V DC while all outputs ON)		0.55W	1.03W	1.82W
Output Delay	Turn ON Time	300µs maximum		
	Turn OFF Time	300µs maximum		
Weight		85g	70g	105g

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Relay Output Module Specifications

Part Number		FC4A-R081	FC4A-R161
Output Points		8 (4/1 common)	16 (8/1 common)
Output		1NO (form A)	
Maximum Load Current		2A per point	
		7A per common	8A per common
Minimum Switching Load		0.1mA/0.1V DC (reference value)	
Initial Contact Resistance		30mΩ maximum	
Electrical Life		100,000 operations minimum (rated load 1,800 operations/hour)	
Mechanical Life		20,000,000 operations minimum (no load 1,8000 operations/hour)	
Rated Load		240V AC/2A (resistive load, inductive load cos ø = 0.4) 30V DC/2A (resistive load, inductive load L/R = 7ms)	
Dielectric Strength		Between output and ⏚ or ⏚ terminals: 1,500V AC 1 minute Between output terminal and internal circuit: 1,500V AC, 1 minute Between output terminals (COMs): 1,500V AC, 1 minute	
Connector On Mother Board		MC1.5/11-G-3.81BK (Phoenix Contact)	MC1.5/10-G-3.81BK (Phoenix Contact)
Connector Insertion/ Removal Durability		100 times minimum	
Applicable Ferrule		1-wire: A1 0.5-8 WH 2-wire: A1-TWIN 2×0.5-8 WH	
Internal Current Draw	All outputs ON	30mA (5V DC) 40mA (24V DC)	45mA (5V DC) 75mA (24V DC)
	All outputs OFF	5mA (5V DC) 0mA (24V DC)	5mA (5V DC) 0mA (24V DC)
Internal Power Consumption (at 24V DC while all outputs ON)		1.16W	2.10W
Weight		110g	145g

Combination I/O Module Specifications

Part Number		FC4A-M08BR1	FC4A-M24BR2
Input Specifications	Input Points	4 (4/1 common)	16 (16/1 common)
	Input Voltage	24V DC sink/source input signal	
	Input Voltage Range	20.4 to 28.8V DC	
	Input Current	7mA/point (24V DC)	
	Input Impedance	3.4kΩ	
	ON Voltage	15V minimum	
	OFF Voltage	5V maximum	
	ON Current	4.2mA minimum (at 15V DC)	
	OFF Current	1.2mA maximum	
	Turn ON Time	4ms (24V DC)	
	Turn OFF Time	4ms (24V DC)	
	Isolation	Between input terminals: Not isolated Internal circuit: Photocoupler isolated	
	External Load for I/O Interconnection	Not needed	
	Signal Determination Method	Static	
	Effect of Improper Input Connection	Both sinking and sourcing input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused.	
	Cable Length	3m in compliance with electromagnetic immunity	

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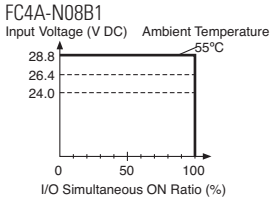
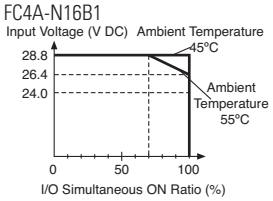
Part Number		FC4A-M08BR1	FC4A-M24BR2
Output Specifications	Output Points	4 (4/1 common)	8 (4/1 common)
	Output	1NO (form A)	
	Maximum Load Current	2A per point 7A per common	
	Minimum Switching Load	0.1mA/0.1V DC (reference value)	
	Initial Contact Resistance	30 mΩ maximum	
	Electrical Life	100,000 operations minimum (rated load 1,800 operations/hour)	
	Mechanical Life	20,000,000 operations minimum (no load 18,000 operations/hour)	
	Rated Load	240V AC/2A (resistive load, inductive load cos ø = 0.4) 30V DC/2A (resistive load, inductive load L/R = 7ms)	
	Dielectric Strength	Between output and ⏚ or ⏚ terminals: 1,500V AC, 1 minute Between output terminal and internal circuit: 1,500V AC, 1 minute Between output terminals (COMs): 1,500V AC, 1 minute	
Connector on Mother Board		MC1.5/11-G-3.81BK (Phoenix Contact)	Input: F6018-17P (Fujicon) Output: F6018-11P (Fujicon)
Connector Insertion/Removal Durability		100 times minimum	Not removable
Internal Current Draw	All I/Os ON	25mA (5V DC), 20mA (24V DC)	65mA (5V DC), 45mA (24V DC)
	All I/Os OFF	5mA (5V DC), 0mA (24V DC)	10mA (5V DC), 0mA (24V DC)
Internal Power Consumption (at 24V DC while all I/Os are ON)		0.65W	1.52W
Weight		95g	140g

Input Usage Limits

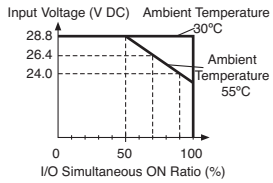
FC4A-N08B1



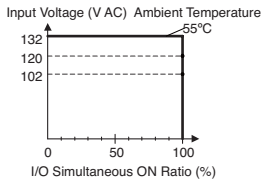
FC4A-N16B1



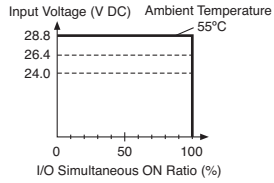
FC4A-N16B3/N32B3



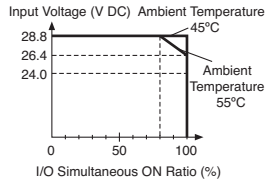
FC4A-N08A11



FC4A-M08BR1



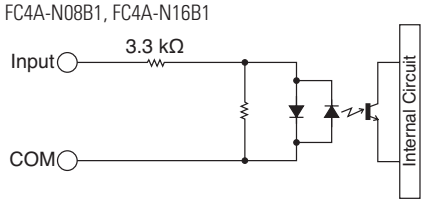
FC4A-M24BR2



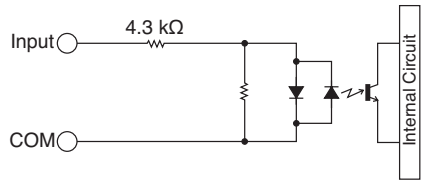
When using at an operating ambient temperature above 40°C, reduce the input voltage or the quantity of I/O points that turn on simultaneously.

Input Internal Circuit

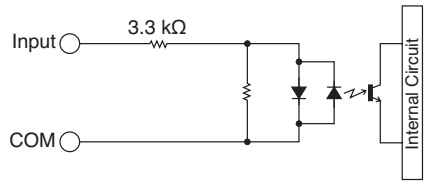
FC4A-N08B1, FC4A-N16B1



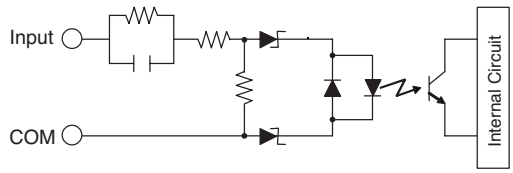
FC4A-N16B3, FC4A-N32B3



FC4A-M08BR1, FC4A-M24BR2

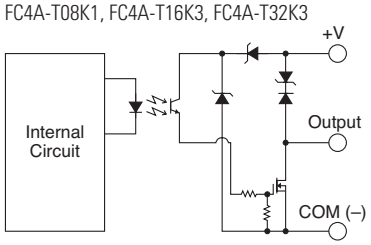


FC4A-N08A11

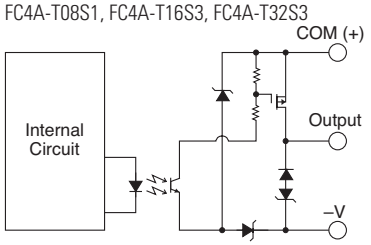


Output Internal Circuit

FC4A-T08K1, FC4A-T16K3, FC4A-T32K3



FC4A-T08S1, FC4A-T16S3, FC4A-T32S3



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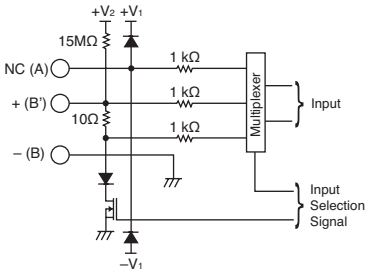
Analog I/O Modules Specifications

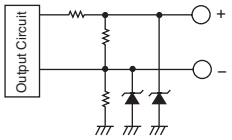
Analog I/O Module Specifications

Part Number	FC4A-L03A1	FC4A-L03AP1	FC4A-J2A1	FC4A-K1A1
Input Points	2	2	2	—
Input Signal	Voltage input (0 to 10V DC) Current input (4 to 20mA)	Thermocouple Resistance thermometer	Voltage input (0 to 10V DC) Current input (4 to 20mA)	—
Output Points	1	1	—	1
Output Signal	Voltage output (0 to 10V DC) Current output (4 to 20mA)	Voltage output (0 to 10V DC) Current output (4 to 20mA)	—	Voltage output (0 to 10V DC) Current output (4 to 20mA)
Power Voltage	24V DC			
Allowable Voltage Range	20.4 to 28.8V DC			
External Current Draw *	45mA (24V DC)	40mA (24V DC)	35mA (24V DC)	40mA (24V DC)
Connector on Mother Board	MC1.5/11-G-3.81BK (Phoenix Contact)			
Connector Insertion/Removal Durability	100 times minimum			
Applicable Ferrule	1 terminal: A1 0.5-8 WH, 2 terminals: A1-TWIN 2×0.5-8 WH			
Internal Current Draw	50mA (5V DC)			
Internal Power Consumption	0.34W (at 24V DC while all I/Os are ON)			
Weight	85g			

Input Circuit



Output Circuit



Part Number		FC4A-J4CN1	FC4A-J8C1	FC4A-J8AT1	FC4A-K2C1
I/O Points		4 inputs	8 inputs	8 inputs	2 outputs
Power Voltage		24V DC			
Allowable Voltage Range		20.4 to 28.8V DC			
Connector on Mother Board		MC1.5/11-G-3.81BK (Phoenix Contact)			
Connector Insertion/Removal Durability		100 times minimum			
Internal Current Draw	5V DC	30mA	30mA	30mA	45mA
	24V DC	0mA			
External Current Draw *		50mA (24V DC)	40mA (24V DC)	25mA (24V DC)	75mA (24V DC)
Weight		140g	140g	125g	110g

* The external current draw is the value when all the analog inputs are used and the analog output value is at 100%.

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Analog Input Specifications (1)

Part Number		FC4A-L03A1, FC4A-J2A1		FC4A-L03AP1	
Input Signal		Voltage Input 0 to 10V	Current Input 4 to 20mA	Thermocouple Type K (0 to 1300°C) Type J (0 to 1200°C) Type T (0 to 400°C)	Resistance Thermometer Pt100 3-wire type (–100 to 500°C)
Input Impedance		1 MΩ minimum	10Ω	1 MΩ minimum	1 MΩ minimum
Allowable Conductor Resistance (per wire)		—	—	—	200Ω maximum
Input Detection Current		—	—	—	1.0mA maximum
Sampling Duration Time		20ms maximum		20ms maximum	
Sampling Repetition Time		20ms maximum		20ms maximum	
Total Input System Transfer Time		105ms + 1 scan time		200ms + 1 scan time	
Input		Single-ended	Differential		
Operating Mode		Self-scan			
Conversion Method		∑ Δ type ADC			
Input Error	Maximum Error at 25°C	±0.2% of full scale		±0.2% of full scale plus reference junction compensation accuracy (±4°C maximum)	±0.2% of full scale
	Temperature Coefficient	±0.006% of full scale /°C			
	Repeatability after Stabilization Time	±0.5% of full scale			
	Non-linearity	±0.2% of full scale			
	Maximum Error	±1% of full scale			
Digital Resolution		4096 increments (12 bits)			
Output Value of LSB		2.5mV	4µA	Type K: 0.325°C Type J: 0.300°C Type T: 0.100°C	0.15°C
Data Type in Application Program		Default: 0 to 4095 (12-bit data) Optional: –32768 to 32767 (optional range designation) [1]			
Monotonicity		Yes			
Input Data Out of Range		Detectable [2]			
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	±3% maximum when a 500V clamp voltage is applied to the power and I/O wiring			Accuracy is not assured when noise is applied.
	Input Filter	No			
	Cable	Twisted pair shielded cable is recommended for improved noise immunity		—	
	Crosstalk	2 LSB maximum			
Dielectric Strength		500V (between input and power circuit)			
Type of Protection		Photocoupler-isolated (between input and internal circuit)			
Effect of Improper Input Connection		No damage			
Maximum Permanent Allowed Overload (No Damage)		13V DC	40mA	—	
Selection of Analog Input Signal		Using software programming			
Calibration or Verification to Maintain Rated Accuracy		N/A			

1: The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between –32768 and 32767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
2: When an error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

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Analog Input Specifications (2)

Part Number	FC4A-J4CN1, FC4A-J8C1		FC4A-J4CN1		FC4A-J8AT1	
Input Signal	Voltage Input	Current Input	Thermocouple	Resistance Thermometer	NTC Thermistor	PTC Thermistor
Input Range	0 to 10V	4 to 20mA	Type K (0 to 1300°C) Type J (0 to 1200°C) Type T (0 to 400°C)	Pt100, Pt1000 3-wire type (–100 to 500°C) Ni100, Ni1000 3-wire type (–60 to 180°C)	–50 to +150°C	
Input Impedance	1 MΩ minimum	12 Ω (FC4A-J4CN1)	0.9 MΩ minimum	—	—	
		100Ω (FC4A-J8C1)	—	—	—	
Input Detection Current	—	—	—	0.1mA	0.1mA	
Sampling Duration Time	FC4A-J4CN1: 5ms maximum				1ms maximum	
	FC4A-J8C1: 1ms maximum		—	—		
Sampling Repetition Time	FC4A-J4CN1: 5ms maximum				10ms × channels	
	FC4A-J8C1: 1ms maximum		—	—		
Total Input System Transfer Time	FC4A-J4CN1: 40ms/ch + 1 scan time				10ms/ch + 1 scan time	
	FC4A-J8C1: 6ms/ch + 1 scan time		—	—		
Input	Single-ended input					
Operating Mode	Self-scan					
Conversion Method	∑ Δ type ADC (FC4A-J4CN1), Successive approximation register method (FC4A-J8C1, FC4A-J8AT1)					
Input Error: Maximum Error at 25°C	—		±0.005% of full scale /°C			
Input Error: Plus Reference Junction Compensation Accuracy	—	—	—	±2°C maximum	—	
Input Error: Temperature Coefficient	±0.005% of full scale/°C					
Input Error: Repeatability after Stabilization Time	±0.5% of full scale				±0.5% of full scale /°C	
Input Error: Non-linearity	±0.04% of full scale				Non-linear	
Input Error: Maximum Error	±1% of full scale				±1% of full scale	
Digital Resolution	50000 increments (16 bits)		Type K: Approx. 24000 increments (15 bits) Type J: Approx. 33000 increments (15 bits) Type T: Approx. 10000 increments (14 bits)	Pt100: Approx. 6400 increments (13 bits) Pt1000: Approx. 64000 increments (16 bits) Ni100: Approx. 4700 increments (13 bits) Ni1000: Approx. 47000 increments (16 bits)	Approx. 4000 increments (12 bits)	
Output Value of LSB	0.2mV	0.32µA	Type K: 0.058°C Type J: 0.038°C Type T: 0.042°C	Pt100: 0.086°C Pt1000: 0.0086°C Ni100: 0.037°C Ni1000: 0.0037°C	30Ω	
Data Type in Application Program	Default: 0 to 50000 Optional: –32768 to 32767 (optional range designation) [2]				Default: 0 to 4000	
					Optional: –32768 to 32767 (optional range designation) [1]	
					Temperature: C, °F	—
	—		Temperature: °C, °F		Resistance: 0 to 10000	
Monotonicity	Yes					
Input Data Out of Range	Detectable					
Noise Resistance: Maximum Temporary Deviation during Electrical Noise Tests	Accuracy is not assured when noise is applied.					
Noise Resistance: Input Filter	Software selectable					
Noise Resistance: Cable	Twisted pair shielded cable is recommended for improved noise immunity		—		Twisted pair shielded cable is recommended for improved noise immunity	
Noise Resistance: Crosstalk	2 LSB maximum					
Isolation	Between input and power circuit: Isolated Between input and internal circuit: Photocoupler-isolated					

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Effect of Improper Input Connection	No damage				
Maximum Permanent Allowed Overload (No Damage)	11V DC	22mA DC	—	—	—
Selection of Analog Input Signal	Using software programming				
Calibration or Verification to Maintain Rated Accuracy	N/A				

1: The 16-bit data (0 to 50000) processed in the analog I/O module can be linear-converted to a value between –32768 and 32767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
2: When an error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.

Analog Output Specifications

Part Number			FC4A-L03A1	FC4A-L03AP1	FC4A-K1A1	FC4A-K2C1
Output Voltage			0 to 10V DC			–10 to +10V DC
Output Range			4 to 20mA			
Load Impedance			Voltage Output: 2kΩ minimum Current Output: 300kΩ maximum			
Load			Resistive load			
Settling Time			50ms	130ms	50ms	1ms/ch
Total Output Transfer Time			50ms + 1 scan time	130ms + 1 scan time	50ms + 1 scan time	1ms × channels+ 1 scan time
Output Error	Maximum Error at 25× C		±0.2% of full scale			
	Temperature Coefficient		±0.015% of full scale/°C			±0.005% of full scale/°C
	Repeatability after Stabilization Time		±0.5% of full scale			
	Output Voltage Drop		±1% of full scale			
	Non-linearity		±0.2% of full scale			
	Output Ripple		1 LSB maximum			
	Overshoot		0%			
	Total Error		±1% of full scale			
Digital Resolution			4096 increments (12 bits)			50000 increments (16 bits)
Output Value of LSB		Voltage	2.5mV			0.4mV
		Current	4µA			0.32µA
Data Type in Application Program			Default: 0 to 4095 (standard)			–25000 to 25000 (voltage)
						0 to 50000 (current)
			Optional: –32768 to 32767 (optional range designation) [1]			
Monotonicity			Yes			
Current Loop Open			Undetectable			
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests		±3% maximum when a 500V clamp voltage is applied to the power and I/O wiring			Not assured
	Cable		Twisted pair shielded cable is recommended for improved noise immunity			Twisted pair cable
	Crosstalk		None			2 LSB maximum
Isolation	Between output and power circuit		500V			Isolated
	Between output and internal circuit		Photocoupler-isolated			
Effect of Improper Output Connection			No damage			
Selection of Analog Output Signal			Using software programming			
Calibration or Verification to Maintain Rated Accuracy			N/A			

1. The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between –32768 and 32767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

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Expansion Interface Module Specifications

Part Number		FC5A-EXM1M (Expansion Interface Master Module)	FC5A-EXM1S (Expansion Interface Slave Module)	FC5A-EXM2 (Expansion Interface Module)
Rated Power Voltage		—	24V DC (supplied from external power)	24V DC (supplied from external power)
Allowable Voltage Range		—	20.4 to 26.4V DC (including ripple)	20.4 to 26.4V DC (including ripple)
Current Draw		Internal power (supplied from CPU module): 90mA (5V DC) 0mA (24V DC)	Internal power (supplied from CPU module): 0mA (5V DC) 0mA (24V DC) External power: With I/O modules 750mA (26.4V DC) [1]	Internal power (supplied from CPU module): 50mA (5V DC) 0mA (24V DC) External power: With I/O modules 750mA (26.4V DC) [1]
Maximum Power Consumption (External Power) [1]		—	19W (26.4V DC)	19W (26.4V DC)
Allowable Momentary Power Interruption		—	10ms minimum (24V DC)	10ms minimum (24V DC)
I/O Expansion		Between CPU module and expansion interface module Connectable CPU modules: FC5A-D16RK1/D16RS1/D32K3/D32S3 Connectable I/O modules: 7 maximum Beyond the expansion interface module Connectable I/O modules: 8 digital I/O modules maximum (AC input modules are not applicable) [2]		
I/O Refresh Time [3]		3.6ms		2.8ms
Communication between CPU Module and Expansion Interface Module		Asynchronous communication (I/O refresh of I/O modules on both sides of the expansion interface module is asynchronous.)		
Isolation from Internal Circuit		Only communication interface part is isolated		Not isolated
EMC Compliant Cable Length		1m (FC5A-KX1C)		—
Power Supply Connector	Connector on Mother Board	—	MKDSN1.5/3-5.08-BK (Phoenix Contact)	MSTB2.5/3-GF-5.08BK (Phoenix Contact)
	Connector Insertion/Removal Durability	—	—	100 times minimum
Expansion Cable Connector	Connector on Mother Board	FCN-365P024-AU (Fujitsu Component)		—
	Connector Insertion/Removal Durability	100 times minimum		—
Weight		70g	135g	140g

1: Power consumption by the expansion interface module and eight I/O modules.
2: The maximum number of relay outputs that can be turned on simultaneously is 54 points.
3: Maximum I/O refresh time of the expansion interface module. D8252 stores the refresh time.

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Instructions

Basic Instructions

Symbol	Function	Qty of Bytes	
		FC5A-D16RK1, -D16RS1 FC5A-D32K3, -D32S3	Others
AND	Series connection of NO contact	4	4
AND LOD	Series connection of circuit blocks	4	5
ANDN	Series connection of NC contact	4	4
BPP	Restores the result of bit logical operation which was saved temporarily	4	2
BPS	Saves the result of bit logical operation temporarily	4	5
BRD	Reads the result of bit logical operation which was saved temporarily	4	3
CC=	Equal to comparison of counter current value	10	7
CC≥	Greater than or equal to comparison of counter current value	10	7
CDP	Dual pulse reversible counter (0 to 65535)	12	4
CNT	Adding counter (0 to 65535)	12	4
CUD	Up/down selection reversible counter (0 to 65535)	12	4
DC=	Equal to comparison of data register value	10	8
DC≥	Greater than or equal to comparison of data register value	10	8
END	Ends a program	4	2
JEND	Ends a jump instruction	4	4
JMP	Jumps a designated program area	6	4
LOD	Stores intermediate results and reads contact status	4	6
LODN	Stores intermediate results and reads inverted contact status	4	6
MCR	Ends a master control	4	4
MCS	Starts a master control	4	4
OR	Parallel connection of NO contact	4	4
OR LOD	Parallel connection of circuit blocks	4	5
ORN	Parallel connection of NC contact	4	4
OUT	Outputs the result of bit logical operation	4	6
OUTN	Output the inverted result of bit logical operation	4	6
RST	Resets output, internal relay, or shift register bit	4	6
SET	Sets output, internal relay, or shift register bit	4	6
SFR	Forward shift register	10	6
SFRN	Reverse shift register	10	6
SOTD	Falling-edge differentiation output	4	5
SOTU	Rising-edge differentiation output	4	5
TIM	Subtracting 100-ms timer (0 to 6553.5 sec)	12	4
TMH	Subtracting 10-ms timer (0 to 655.35 sec)	12	4
TML	Subtracting 1-sec timer (0 to 65535 sec)	12	4
TMS	Subtracting 1-ms timer (0 to 65.535 sec)	12	4

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Advanced Instructions

Symbol	Function	Slim		All-in-One		
		—	FC5A -D16RK1, -D16RS1, -D32K3, -D32S3	FC5A -C10R2, C10R2C	FC5A -C16R2, C16R2C	FC5A -C24R2, C24R2C
		FC4A -D20K3, -D20S3	FC4A -D20RK1, -D20RS1, -D40K3, -D40S3	FC4A -C10R2, -C10R2C	FC4A -C16R2, -C16R2C	FC4A -C24R2, -C24R2C
NOP	No Operation	×	×	×	×	×
MOV	Move	×	×	×	×	×
MOVN	Move Not	×	×	×	×	×
IMOV	Indirect Move	×	×	×	×	×
IMOVN	Indirect Move Not	×	×	×	×	×
BMOV	Block Move	—	×	*	*	*
IBMV	Indirect Bit Move	—	×	*	*	*
IBMVN	Indirect Bit Move Not	—	×	*	*	*
CMP=	Compare Equal To	×	×	×	×	×
CMP< >	Compare Unequal To	×	×	×	×	×
CMP<	Compare Less Than	×	×	×	×	×
CMP >	Compare Greater Than	×	×	×	×	×
CMP < =	Compare Less Than or Equal To	×	×	×	×	×
CMP > =	Compare Greater Than or Equal To	×	×	×	×	×
ICMP > =	Interval Compare Greater Than or Equal to	—	×	*	*	*
ADD	Addition	×	×	×	×	×
SUB	Subtraction	×	×	×	×	×
MUL	Multiplication	×	×	×	×	×
DIV	Division	×	×	×	×	×
ROOT	Root	×	×	×	×	×
ANDW	AND Word	×	×	×	×	×
ORW	OR Word	×	×	×	×	×
XORW	Exclusive OR Word	×	×	×	×	×
SFTL	Shift Left	×	×	×	×	×
SFTR	Shift Right	×	×	×	×	×
•BCDLS	•BCD Left Shift	–	×	*	*	*
WSFT	Word Shift	—	×	*	*	*
ROTL	Rotate Left	×	×	×	×	×
ROTR	Rotate Right	×	×	×	×	×
HTOB	Hex to BCD	×	×	×	×	×
BTOH	BCD to Hex	×	×	×	×	×
HTOA	Hex to ASCII	×	×	×	×	×
ATOH	ASCII to Hex	×	×	×	×	×
BTOA	BCD to ASCII	×	×	×	×	×
ATOB	ASCII to BCD	×	×	×	×	×
ENCO	Encode	—	×	*	*	*
DECO	Decode	—	×	*	*	*
BCNT	Bit Count	—	×	*	*	*
ALT	Alternate Output	—	×	*	*	*
CVDT	Convert Data Type	—	*	*	*	*
WKTIM	Week Timer	×	×	×	×	×
WKTBL	Week Table	×	×	×	×	×
DISP	Display	×	×	—	—	*
DGRD	Digital Read	×	×	—	—	*
TXD1	Transmit 1	×	×	×	×	×
TXD2	Transmit 2	×	×	*	×	×
RXD1	Receive 1	×	×	×	×	×

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Symbol	Function	Slim		All-in-One		
		—	FC5A -D16RK1, -D16RS1, -D32K3, -D32S3	FC5A -C10R2, C10R2C	FC5A -C16R2, C16R2C	FC5A -C24R2, C24R2C
		FC4A -D20K3, -D20S3	FC4A -D20RK1, -D20RS1, -D40K3, -D40S3	FC4A -C10R2, -C10R2C	FC4A -C16R2, -C16R2C	FC4A -C24R2, -C24R2C
RXD2	Receive 2	×	×	*	×	×
LABEL	Label	×	×	×	×	×
LJMP	Label Jump	×	×	×	×	×
LCAL	Label Call	×	×	×	×	×
LRET	Label Return	×	×	×	×	×
IOREF	I/O Refresh	×	×	×	×	×
HSCRF	High-speed Counter Refresh	—	*	*	*	*
FRQRF	Frequency Measurement Refresh	—	*	*	*	*
DI	Disable Interrupt	—	×	*	*	*
EI	Enable Interrupt	—	×	*	*	*
XYFS	XY Format Set	×	×	*	*	×
CVXTY	Convert X to Y	×	×	*	*	×
CVYTX	Convert Y to X	×	×	*	*	×
AVRG	Average	—	*	*	*	*
PULS1	Pulse Output 1	×	×	—	—	—
PULS2	Pulse Output 2	×	×	—	—	—
PULS3	Pulse Output 3	—	°	—	—	—
PWM1	Pulse Width Modulation 1	×	×	—	—	—
PWM2	Pulse Width Modulation 2	×	×	—	—	—
PWM3	Pulse Width Modulation 3	—	°	—	—	—
RAMP1	Ramp Pulse Output 1	×	×	—	—	—
RAMP2	Ramp Pulse Output 2	—	°	—	—	—
ZRN1	Zero Return 1	—	×	—	—	—
ZRN2	Zero Return 2	—	×	—	—	—
ZRN3	Zero Return 3	—	°	—	—	—
PID	PID Control	×	×	—	—	×
DTML	1-sec Dual Timer	—	×	*	*	*
DTIM	100-ms Dual Timer	—	×	*	*	*
DTMH	10-ms Dual Timer	—	×	*	*	*
DTMS	1-ms Dual Timer	—	×	*	*	*
TTIM	Teaching Timer	—	×	*	*	*
RUNA	Run Access	—	×	—	—	*
STPA	Stop Access	—	×	—	—	*
RAD	Degree to Radian	—	*	*	*	*
DEG	Radian to Degree	—	*	*	*	*
SIN	Sine	—	*	*	*	*
COS	Cosine	—	*	*	*	*
TAN	Tangent	—	*	*	*	*
ASIN	Arc Sine	—	*	*	*	*
ACOS	Arc Cosine	—	*	*	*	*
ATAN	Arc Tangent	—	*	*	*	*
LOGE	Natural Logarithm	—	*	*	*	*
LOG10	Common Logarithm	—	*	*	*	*
EXP	Exponent	—	*	*	*	*
POW	Power	—	*	*	*	*

×: Available *: Not available on the FC4A ° : Available on the FC5A-D32K3 and FC5A-D32S3 only

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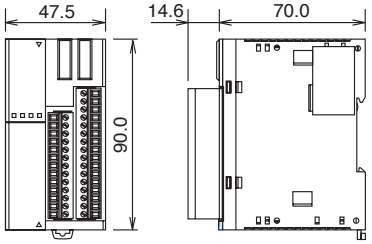
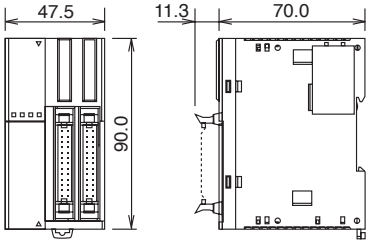
Dimensions (mm)

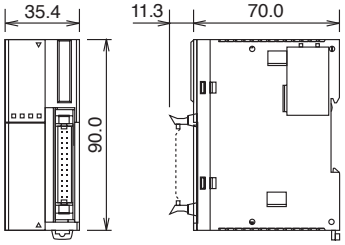
FC5A-D16RK1, FC4A-D20RK1, FC5A-D16RS1 FC4A-D20RS1



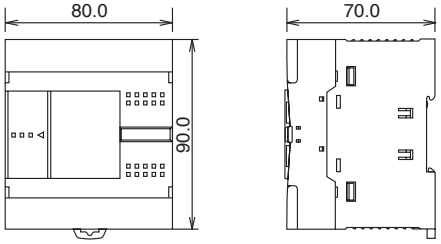
FC5A-D32K3, FC5A-D32S3 FC4A-D40K3, FC4A-D40S3



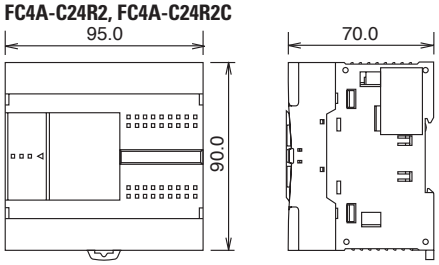
FC5A-EXM1S FC4A-D20K3, FC4A-D20S3



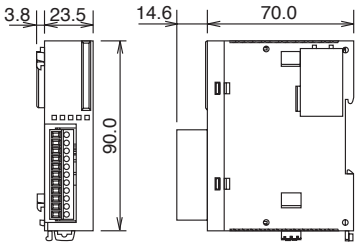
FC5A-C10R2, FC5A-C10R2C, FC4A-C10R2, FC4A-C10R2C, FC5A-C16R2 FC5A-C16R2C FC4A-C16R2 FC4A-C16R2C



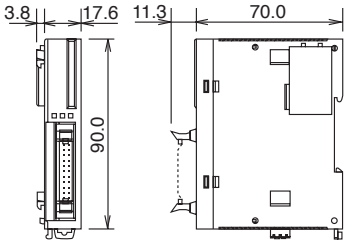
FC5A-C24R2, FC5A-C24R2C FC4A-C24R2, FC4A-C24R2C



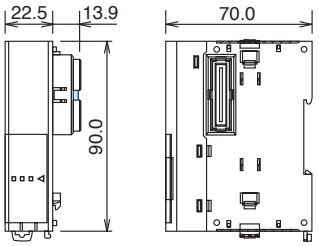
FC4A-N08B1, FC4A-R081, FC4A-T08S1, FC4A-L03A1, FC4A-J2A1, FC4A-J4CN1, FC4A-J8AT1, FC4A-AS62M, FC4A-N08A11, FC4A-T08K1, FC4A-M08BR1, FC4A-L03AP1, FC4A-K1A1, FC4A-J8C1, FC4A-K2C1,



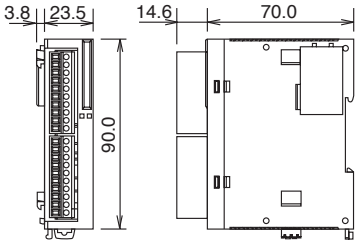
FC4A-EXM1M FC4A-N16B3, FC4A-T16K3, FC4A-T16S3



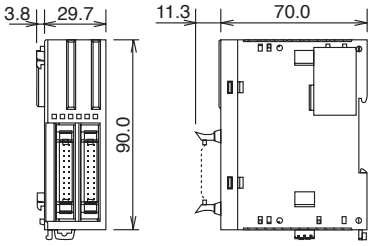
FC4A-HPC1, FC4A-HPC2, FC4A-HPC3



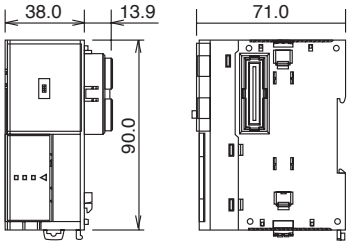
FC4A-N16B1, FC4A-R161



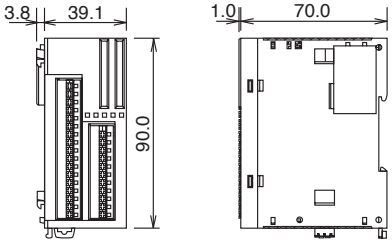
FC4A-N32B3, FC4A-T32K3, FC4A-T32S3



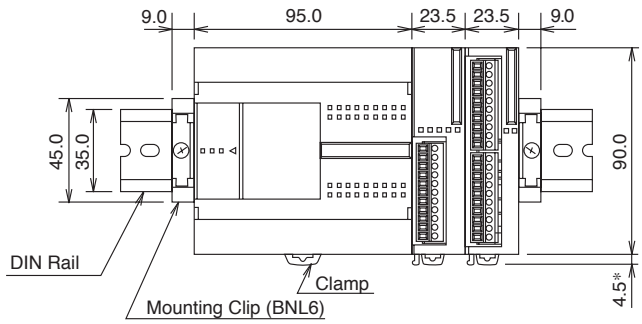
FC4A-HPH1



FC5A-EXM2, FC4A-M24BR2



Example



The figure illustrates a system setup consisting of the all-in-one 24-I/O CPU module, an 8-point relay output module, and a 16-point DC input module mounted on a 35-mm-wide-DIN rail using BNL6 mounting clips.

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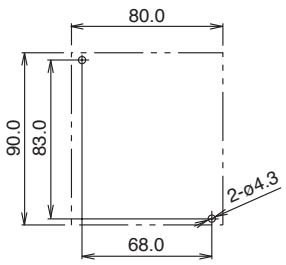
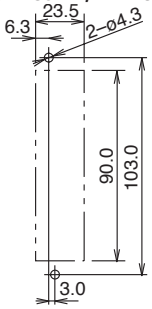
Mounting Hole Layout (mm)

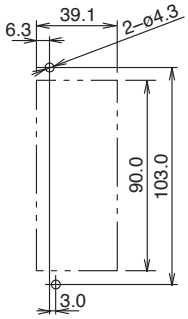
FC5A-C10R2, FC5A-C16R2
FC5A-C10R2C, FC5A-C16R2C
FC4A-C10R2, FC4A-C16R2
FC4A-C10R2C, FC4A-C16R2C



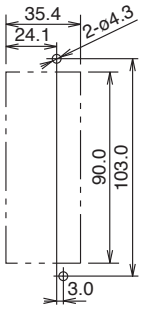
FC4A-N08A11, FC4A-R081
FC4A-R161, FC4A-T08K1
FC4A-T08S1, FC4A-M08BR1
FC4A-L03A1, FC4A-L03AP1
FC4A-J2A1, FC4A-K1A1
FC4A-J4CN1, FC4A-T8C1
FC4A-J8AT1, FC4A-K2C1



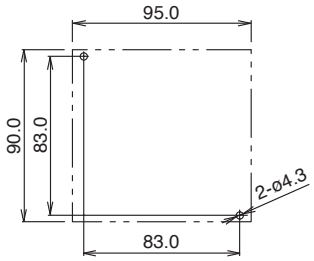
FC5A-EXM2
FC4A-M24BR2



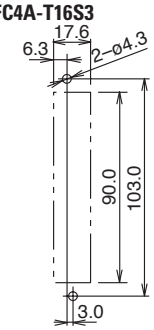
FC5A-EXM1S, FC4A-D20K3
FC4A-D20S3



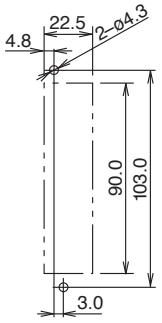
FC5A-C24R2,
FC4A-C24R2C
FC4A-C24R2,
FC4A-C24R2C



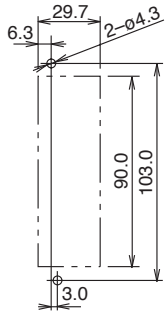
FC5A-EXM1M
FC4A-N16B3, FC4A-T16K3,
FC4A-T16S3



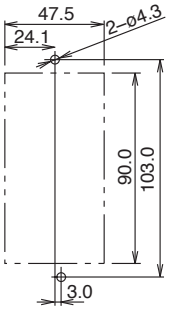
FC4A-HPC1 FC4A-HPC2
FC4A-HPC3



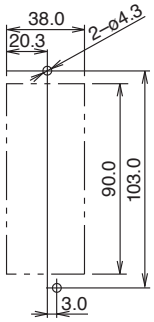
FC4A-N32B3, FC4A-T32K3,
FC4A-T32S3



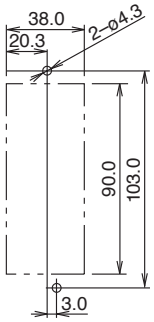
FC5A-D16RK1
FC5A-D16RS1
FC5A-D32K3
FC5A-D32S3
FC4A-D20RK1
FC4A-D20RS1
FC4A-D40K3
FC4A-D40S3



FC4A-HPH1

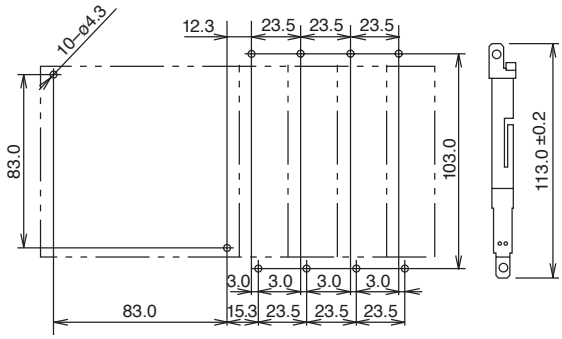


FC4A-HPH1

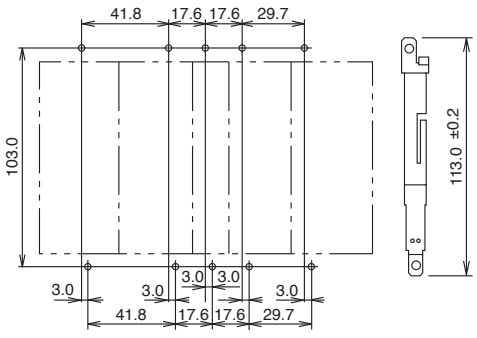


Examples

Mounting hole layout for FC5A-C24R2 or FC4A-C24R2 and four 23.5mm-wide I/O modules



Mounting hole layout from left, FC4A-HPH1, FC4A-D20K3, FC4A-N16B3, FC4A-N32B3, and FC4A-M24BR2 modules



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Web Server

General Specifications

Rated Power Voltage	24V DC
Allowable Voltage Range	20.4 to 26.4V DC
Current Draw	70 mA
Allowable Momentary Power Interruption	10 ms maximum
Dielectric Strength	500V AC, 1 minute
Insulation Resistance	10 MΩ minimum (500V DC megger)
Noise Resistance	DC power terminal: 1.0 kV, 50 ns to 1 µs Ethernet cable: 0.5 kV, 50 ns to 1 µs (coupling clamp)
Inrush Current	4A maximum
Operating Temperature	0 to 55°C
Storage Temperature	–40 to +70°C (no freezing)
Relative Humidity	10 to 95% (no condensation)
Pollution Degree	2 (IEC 60664-1)
Corrosion Immunity	Free from corrosive gases
Degree of Protection	IP20 (IEC60529)
Vibration Resistance	When mounted on a DIN rail: 5 to 9 Hz amplitude 3.5 mm 9 to 150 Hz accelaration 9.8 m/s^2 (1G) 2 hours in each of 3 axes
Shock Resistance	147 m/s^2 (15G), 11 ms duration 3 shocks each in 3 axes
Weight (approx.)	150g

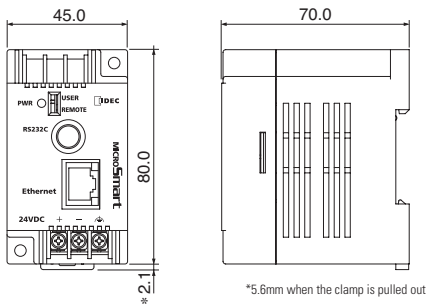
Interface Specifications

Communication	RS232C <=> Ethernet conversion function
Ethernet Specifications	Electrical characteristics: Complies with IEEE802.3 Transmission speed: 10BASE-T/100BASE-TX (Not CE compliant) Communication protocol: IP/ICMP/ARP Ethernet protocol: TCP/SMTP/HTTP/Telnet No. of TCP connections: 1
Serial Interface Specifications	Electrical characteristics: EIA RS232C Transmission speed: 9600 to 115200 bps Synchronization: Asynchronous Communication protocol: Full duplex Transmission control: RTS/CTS, XON/OFF, None
Connection Method	Ethernet interface: RJ45 Serial interface: Mini DIN 8-pin connector Cable Part No.: FC4A-KC3C
Major Functions	Remote maintenance: Uploading, downloading and monitoring using WindLDR via Ethernet
	Web server: Configure the web server unit using Internet Explorer etc. Reading and writing PLC operands using Java applet. Web file area: 512 KB Compliant browser: Internet Explorer 6.0 or higher, Netscape Navigator 7.2
	Ethernet user communication: User communication using Ethernet Message transmission: Registered outgoing message 32 message types, 63 characters maximum per message, 2 email addresses, 64 address characters maximum
Optional	Utility CD: Configuration file, PLC operand monitor sample programs, sample program configuration instructions, instruction manual (English/German/Spanish/Japanese/Chinese)

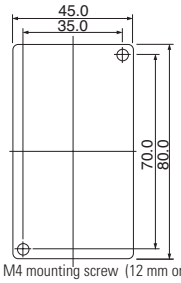
Connectable Devices

Programmable Controllers	Operator Interface
IDEC FC5A MicroSmart	(RS232C communication with PLC through Ethernet)
IDEC FC4A MicroSmart	IDEC HG2F
IDEC FC3A OpenNet Controller	

Dimensions

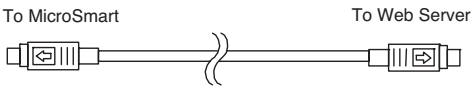


Mounting Hole Layout for Direct Mounting

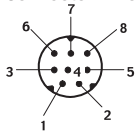


Web Server Cable (FC4A-KC3C, Cable Length: 100 mm)

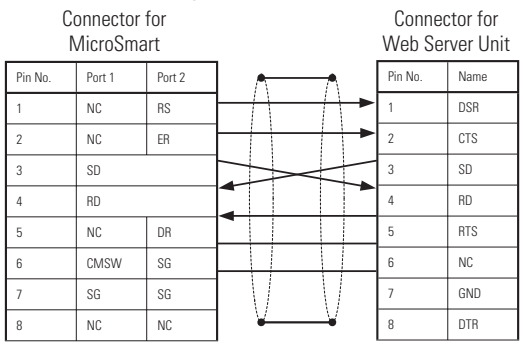
Cable Dimensions



Connector Pinout



Cable Connection Diagram



Pin No.	Port 1	Port 2
1	NC	RS
2	NC	ER
3	SD	
4	RD	
5	NC	DR
6	CMSW	SG
7	SG	SG
8	NC	NC

Pin No.	Name
1	DSR
2	CTS
3	SD
4	RD
5	RTS
6	NC
7	GND
8	DTR

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OpenNet Controller

UL Listed
File #E102342

Features:

- Digital I/O
  -8, 16, and 32 point cards
  -224 inputs and outputs, 480 with expansion power supply
- Analog I/O
  -up to 42 analog inputs or 14 analog outputs
  -0-5V, 0-10V, ±5V, ±10V, 4-20mA
- Built-In Communications Ports
  -2 RS232 (programming port, ASCII, printer and modem ready)
  -1 RS485 (programming port and data link)
- Built-in High-Speed Counter
  -1 channel, 10kHz, 16-bit resolution
- Memory
  -16K words (8K steps) user program capacity
- Realtime Calendar/Clock
- Password Protection
- PID Algorithm

Programming Software; WindLDR®

- Programs all IDEC PLCs
- Windows-based (compatible with Windows 95, 98, 2000,
- NT 4.0, ME, XP or Vista)

Programming Instructions

- Transmit/Receive
- Built-in X/Y Conversion
- Sub-Routine Call/Return for Modular Programming
- Square Root
- 16- and 32-bit Math, Add, Sub, Mult, Div
- Data Conversion to/from Dec, Hex, BCD, ASCII
- Block Move
- Summation
- Averaging
- Day of Week Program Scheduling

Built-in Hayes "AT" command set for modem dialup/ pager application

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Hardware Features

CPUs	**FC3A-CP2K**	High-speed counter sink output
	FC3A-CP2S	High-speed counter source output
Electrical Specifications	**Rated Voltage**	24V DC (19-30V DC, including ripple)
	Maximum Input Current	1.5A at 24V DC
	Reverse Polarity Protection	Prevents damage if incorrectly wired.
	Operating Temperature	0 to +55°C
	Storage Temperature	-25 to +70°C
	Relative Humidity	30 to 95% RH (non-condensing)
	Vibration Resistance	10 to 57 Hz, amplitude 0.075mm 57 to 150 Hz 9.8 m/sec^2 (1G) 10 sweep cycles/axis (IEC 1131)
	Shock Resistance	147 m/sec^2 (15G), 11ms 3 shocks each in 3 axes (IEC 1131)
	Dielectric Strength	Between power terminal and FG: 500V AC, 1 min Between I/O terminal and FG: 1500V AC, 1 min
	Ground	Grounding resistance 100Ω (maximum)
	Mounting Style	35mm DIN rail

The eighth slot must be an expansion power supply module. (Photo is only an example of the range of available modules.)

		Standard ONC CPU
General ONC Specifications	**Available Instructions**	37 basic, 65 advanced (PID, square root, subroutine calls, etc.)
	User Program Capacity	16K words flash memory
	Average Scan Time	1 ms or greater
	Input	224 points (I0-I277)
	Output	224 points (Q0-Q277)
	Total I/O Points	Using expansion power supply: 480 I/O points
	Internal Relay	2048 (M0-M2557)
	Special Internal Relay	192 (M8000-M8237)
	Shift Register	256 (R0-R255)
	Timer	256 (T0-T255; 1-sec, 100-msec, 10-msec, 1-msec)
	Counter	256 (C0-C255; adding, dual pulse reversible, up/down selection reversible)
	Data Register	8000 (D0-D7999)
	Link Register	256 master (L1000 - L1317), 168 slave (L100 - L127, L200 - L227, ..., L700 - L727)
	Remote I/O	512 points
	Real-Time Calendar/Clock Runtime	Yes
	Program Protection	Yes (password protected)
	External Run/Stop Control	Yes
	Power Failure Protection	Yes
	Self-Diagnostics	Yes
	Auto Start Function	Yes

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Part Numbers

Item		Description	Part Number
CPU Modules		High-speed counter, sink output	FC3A-CP2K
		High-speed counter, source output	FC3A-CP2S
Input Modules	DC Input	16 points 24V DC input, sink/source compatible, terminal block	FC3A-N16B1
		16 points 24V DC input, sink/source compatible, nylon connector	FC3A-N16B3
		32 points 24V DC input, sink/source compatible, nylon connector	FC3A-N32B4
		32 points 24V DC input, sink/source compatible, FUJITSU connector	FC3A-N32B5
	AC Input	8 points 100V AC input, terminal block	FC3A-N08A11
	Analog Input	6 channels, 4-20mA, selectable by DIP sw, terminal block	FC3A-AD1261
Output Modules	Analog Output	2 channels, 4-20mA, selectable by DIP sw, terminal block	FC3A-DA1221
	Relay Output	16 points relay output, terminal block	FC3A-R161
		16 points relay output, nylon connector	FC3A-R162
	Transistor Output	16 points transistor output sink, terminal block	FC3A-T16K1
		16 points transistor output sink, nylon connector	FC3A-T16K3
		16 points transistor output protect source, terminal block	FC3A-T16P1
		32 points transistor output sink, nylon connector	FC3A-T32K4
		32 points transistor output sink, FUJITSU connector	FC3A-T32K5
Expansion Module		Expansion power supply	FC3A-EA1
Network Interface Modules		Remote I/O Master Module	FC3A-SX5SM1
		IDEC-Modbus Converter Package (see Communication & Networking section for details)	IDEC-MBUS-CONVPCK
Accessories		Housing (4 pcs/bag) for FC3A-R162	VHR-5N
		Housing (2 pcs/bag) for FC3A-T16K3, -N16B3	VHR-10N
		Housing (2 pcs/bag) for FC3A-T32K4, -N32B4	H18-SHF-AA
		Pins (40 pcs/bag) for FC3A-T32K4, -N32B4	SHF-001T-0.8BS
		Pins (20 pcs/bag) for FC3A-R162/T16K3, -N16B3	SVH-21T-P1.1
		Cable with Fujitsu connector (for FC3A-T32K5/N32B5)	FC3A-KUSA1
		Breakout Module (for FC3A-T32K5, -N32B5)	BX1D-T40A or BX1D-S40A
Software		Windows-based programming software for IDEC PLCs - WindLDR	FC9Y-LP2CDW*
		Software application to link OPC/DDE compliant windows applications to IDEC PLCs (for more information see Communication Section)	WINDSRV†
Programming Cable		Cable to connect ONC to PC	FC2A-KC4C
Manuals		ONC User Manual	EM345-0

1. *For more information on WindLDR see page 23 and the Automation Software section.
2. †For more information on WindSRV see the Automation Software section.

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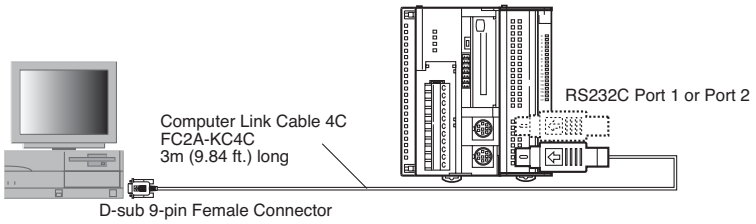
OpenNet Controller, Networking & Applications

PC Communication

The ONC is programmed by our intuitive WindLDR™ software

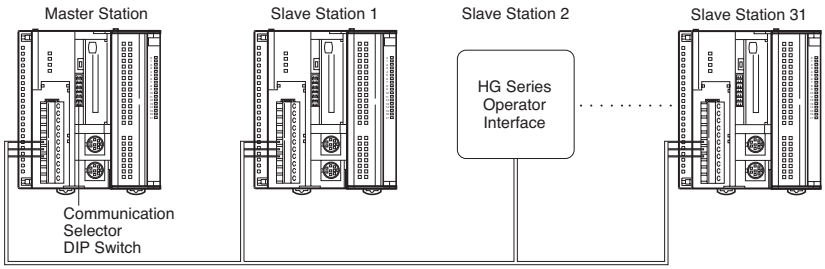
-use RS232 or RS485 ports

-upload, download and monitor programs



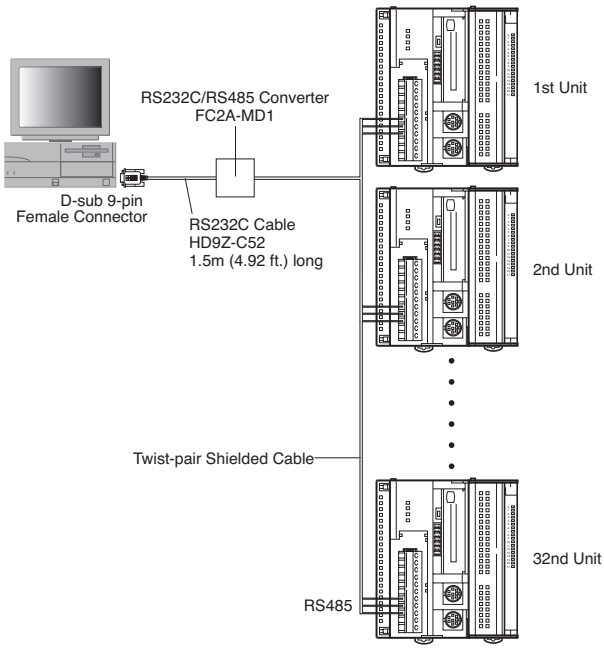
Data Link - Superiority in Networking

Connect up up to 32 ONC PLCs or the HG Series operator interface on a data link network.



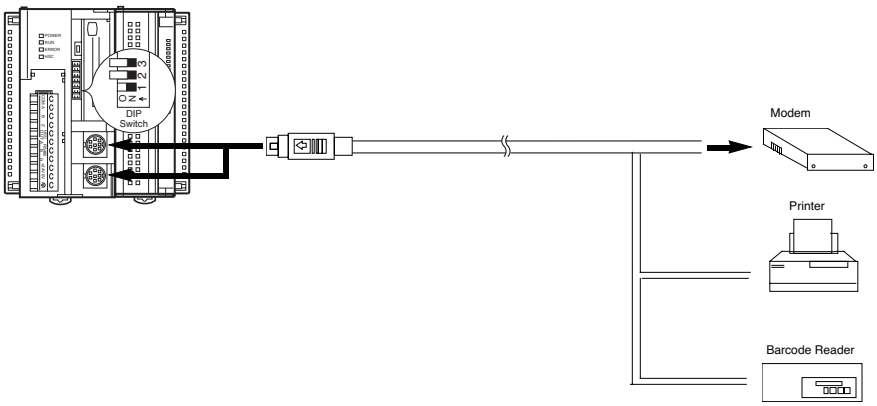
Computer Link - Power & Versatility

Connect 32 ONCs on a 1:N computer link system.
Upload, download, monitor, and update data.



Communication Flexibility

Easy connections to any R232C equipment through the user defined RS232C port 1 or 2.
Built-in Hayes "AT" command set for direct modem dialup and pager applications.



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Analog Input and Output Modules

Analog Output Module
FC3A-DA1221

Features:

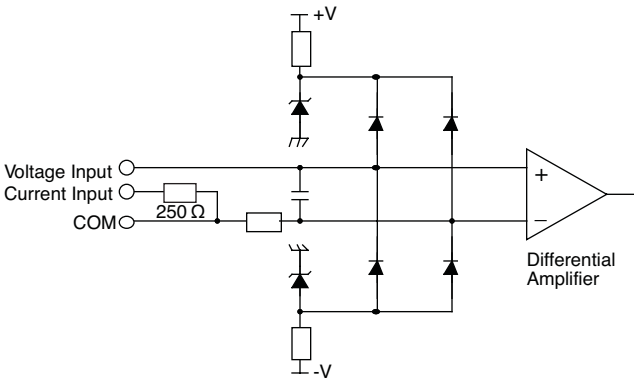
- One card handles 5 different signal types, [±5V, ±10V, 0-5V, 0-10V, or 4-20mA], switch selectable
- Input module has 6 inputs per card, 7 cards per CPU, 42 analog input points maximum
- Output module has 2 outputs per card, 7 cards per CPU, 14 analog output points maximum
- 12-bit resolution, 0-4000 counts, count range divides evenly
- Fast input scan, 3ms + 1 scan time
- I/O error ±0.6% full scale @25°C
- Convenient input termination

Specifications

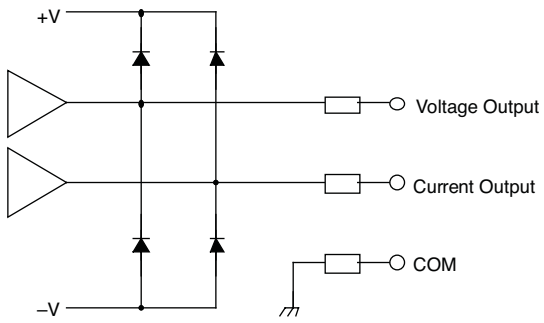
Analog	Input	Output
Points Per Card	6	2
Part Number	FC3A-AD1261	FC3A-DA1221
Connector	Removable screw terminal blocks	Removable screw terminal blocks
Input Signal	0-10V DC, ±10V DC, 0-5V DC, ±5V DC, 4-20mA	0-10V DC, ±10V DC, 0-5V DC, ±5V DC, 4-20mA
Resolution	12 bits	12 bits
Range	0-4000 counts	0-4000 counts
Input Error	±0.6% of full scale @ 25°C	NA
Output Error	NA	±0.6% of full scale @ 25°C
Conversion Time	3ms per point	NA
Settling Time	NA	3ms
Input Impedance	Voltage: 1 MΩ minimum Current: 250Ω	NA
Output Load Impedance	NA	Voltage=2 kΩ minimum (Current=250Ω, 300Ω max.)
Internal Current Draw	120mA@24V DC	120mA@24V DC

Type of Protection

Analog Input Module



Analog Output Module



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16-Point DC Input Modules

DC Input Module
FC3A-N16B1

DC Input Module
FC3A-N16B3

Features:

- One card handles sink (NPN) or source (PNP) input signals
- 16 points per card, 7 cards local, 8 cards expansion, 15 cards max. per CPU
- 19-30V DC input voltage range
- Software selectable input filtering, 0-32 msec
- High-speed catch inputs, first 8 points user definable, pulse detection within 20-120µsec range
- Termination connector
  -FC3A-N16B1 - removable screw terminal blocks
  -FC3A-N16B3 - removable nylon pin connector

Specifications

Input	DC Sink/Source	
Part Number	FC3A-N16B1	FC3A-N16B3
Connector	Screw terminal blocks	Nylon pins
Input Voltage Range	19-30V DC	19-30V DC
Input Voltage	24V DC	24V DC
Current Per Point	7mA	7mA
Internal Current - all inputs ON	40mA	40mA
Input Impedance	3.4kΩ	3.4kΩ
On/Off Voltage	15/5V DC	15/5V DC
On/Off Time	20/120µs	20/120µs

32-Point DC Input Modules

DC Input Module
FC3A-N32B4

DC Input Module
FC3A-N32B5

Features:

- One card handles sink (NPN) or source (PNP) input signals
- 16 points per card, 7 cards local, 8 cards expansion, 15 cards max. per CPU
- 20-30V DC input voltage range
- Software selectable input filtering, 0-32 msec
- High-speed catch inputs, first 8 points user definable, pulse detection within 20-120µsec range
- Termination connector
  -FC3A-N32B4 - removable nylon pin connector
  -FC3A-N32B5 - Fujitsu connector

Specifications

Input	DC Sink/Source	
Part Number	FC3A-N32B4	FC3A-N32B5
Connector	Nylon	Fujitsu
Input Voltage Range	20-28V DC	20-28V DC
Input Voltage	24V DC	24V DC
Current Per Point	5mA	5mA
Internal Current - all inputs ON	50mA	50mA
Input Impedance	4.7kΩ	4.7kΩ
On/Off Voltage	15/5V DC	15/5V DC
On/Off Time	20/120µs	20/120µs

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8-Point AC Input Module

AC Input Module
FC3A-N08A11

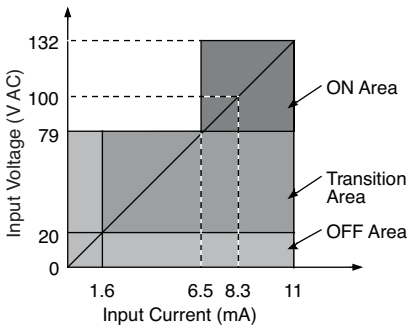
Features:

- 8 points per card, 7 cards local, 8 cards expansion, 15 cards max. per CPU
- 100-120V AC rated input voltage
- 85-132V AC input voltage range
- On/off detection set at 20ms
- Convenient termination connector, removable screw terminal blocks

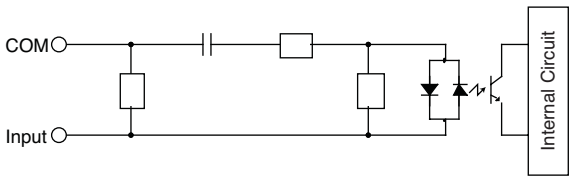
Specifications

Input	AC
Part Number	FC3A-N08A11
Connector	Removable screw terminal blocks
Input Voltage Range	85-132V AC
Input Voltage	100-120V AC
Current Per Point	8mA
Internal Current - all inputs ON	30mA
Input Impedance	12kΩ (60Hz)
On/Off Voltage	79/20V AC
On/Off Time	20ms

Input Operating Range



Input Internal Circuit



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16-Point Relay Output Modules

Relay Output Module
FC3A-R161

Relay Output Module
FC3A-R162

Features:

- 16 points per card, 4 points per common, 15 cards max. per CPU
- Outputs rated 240V AC/2A or 24V DC/2A
- Turn On/Off delay 6-10ms
- 20,000,000 operations per relay minimum
- Termination connector
  -FC3A-R161 - removable removable screw terminal blocks
  -FC3A-R162 - removable nylon pin connectors

Specifications

Output	Relay Output	
Part Number	FC3A-R161	FC3A-R162
Connector	Removable screw terminal blocks	Nylon pin
Output Voltage	240V AC/24V DC	240V AC/24V DC
Current Per Point	2A	2A
Internal Current - all inputs ON	170mA	170mA
On/Off Time	6/10ms	6/10ms

16-Point DC Sink Output Modules

DC Sink Output Module
FC3A-T16K1

DC Sink Output Module
FC3A-T16K3

Features:

- 16 transistor sink outputs per card, 15 cards max. per CPU
- Outputs rated 19-30V DC/0.5A
- Turn On/Off delay 500µsec max.
- Opto-isolated outputs
- Termination connector
  -FC3A-R161 - removable removable screw terminal blocks
  -FC3A-R162 - removable nylon pin connectors

Specifications

Output	DC Sink	
Part Number	FC3A-T16K1	FC3A-T16K3
Connector	Removable screw terminal blocks	Nylon pin
Output Voltage	19-30V DC	19-30V DC
Current Per Point	500mA@ 24V DC	500mA@ 24V DC
Internal Current - all inputs ON	60mA	60mA
On/Off Time	500/500µs	500/500µs

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16-Point DC Protect Source Output Module

Protect Source Output Module
FC3A-T16P1

Features:

- 16 transistor protect source outputs per card, 15 cards max. per CPU
- Outputs rated 19-30V DC/0.5A
- Turn On/Off delay 500µsec max.
- Opto-isolated outputs
- Termination connector, removable screw terminal blocks

Specifications

Output	DC Source
Part Number	FC3A-T16P1
Connector	Removable screw terminal blocks
Output Voltage	19-30V DC
Current Per Point	500mA @ 24V DC
Internal Current - all inputs ON	70mA
On/Off Time	500µs/500µs

32-Point DC Input Modules

DC Sink Output Module
FC3A-T32K4

DC Sink Output Module
FC3A-T32K5

Features:

- 32 transistor sink outputs per card, 15 cards max. per CPU
- Outputs rated 20.4-27.6V DC/0.1A
- Turn On/Off delay 500µsec max.
- Opto-isolated outputs
- Termination connector
  -FC3A-T32K4 - removable nylon pin connector
  -FC3A-T32K5 - removable Fujitsu connector

Specifications

Output	DC Sink	
Part Number	FC3A-T32K4	FC3A-T32K5
Connector	Nylon pin	Fujitsu
Output Voltage	20.4-27.6V DC	20.4-27.6V DC
Current Per Point	100mA@24V DC	100mA@24V DC
Internal Current - all inputs ON	90mA	90mA
On/Off Time	500/500µs	500/500µs

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Expansion Power Supply Module

Expansion Power Supply Module
FC3A-EA1

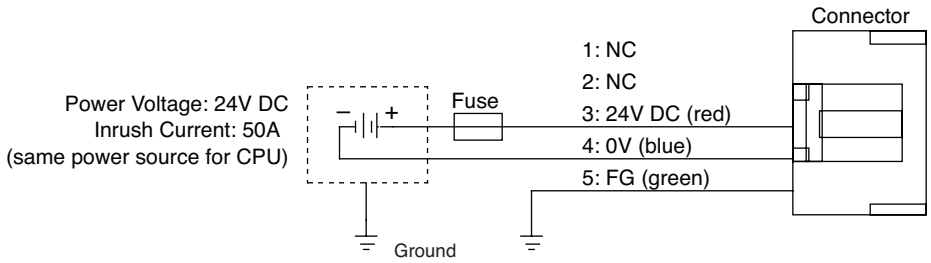
Features:

- Expands the ONC from 224 up to 480 I/O points
- Increases I/O and functional modules by 8
- Comes with a cable connector and contacts
- Simple, easy and convenient mounting
- Install in the 8th slot only

Specifications

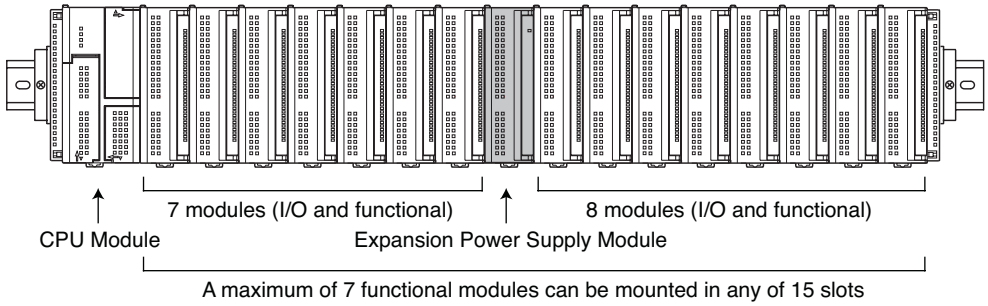
Part Number	FC3A-EA1
Connector	Nylon - 5 pin
Input Voltage Range	19 - 30V DC (including ripple)
Input Voltage	24V DC
Internal Current	30mA
Momentary Power Interruption	10 msec (24V DC), Level PS-2 (EN61131)

Power Supply Wiring



FC3A-EA1 Expansion Power Supply Module Mounting Position

Mount the expansion power supply module in the eighth slot


7 modules (I/O and functional)
8 modules (I/O and functional)
CPU Module
Expansion Power Supply Module
A maximum of 7 functional modules can be mounted in any of 15 slots

Mount the expansion power supply module only in the eighth slot, otherwise correct allocation of I/O and link register numbers may not occur.

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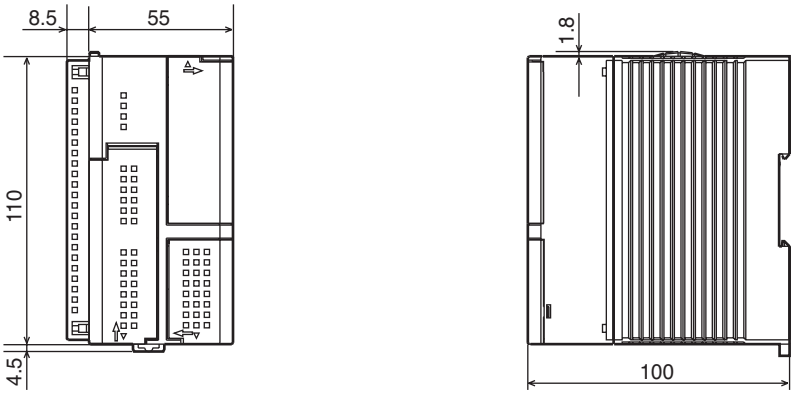
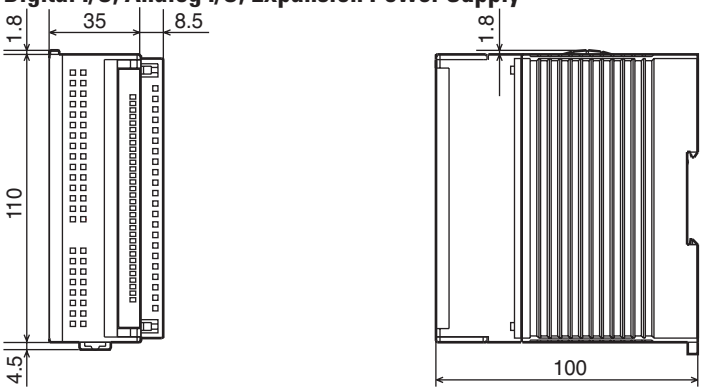
Dimensions

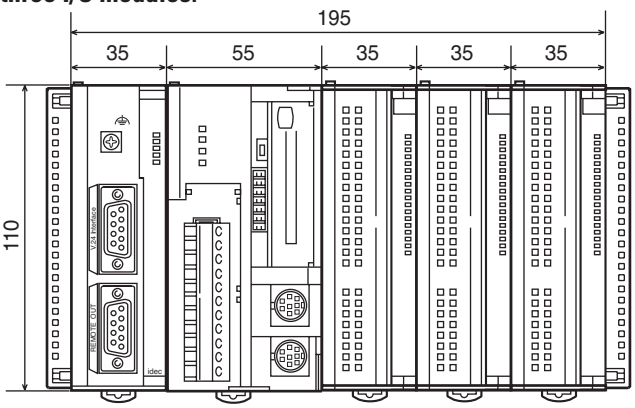
CPU Module



Digital I/O, Analog I/O, Expansion Power Supply



Example: the following figure illustrates a system setup consisting of a remote I/O master module, a CPU module, and three I/O modules.



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IDEC SmartRelay

Performance & Features

When you need a product you can rely on, is easy to use, and meets safety standards, look no further than IDEC. Our SmartRelays meet all industry standard approvals including UL, CE, C-tick and ABS (American Bureau of Shipping). Plus they are FM approved for Class 1 Div 2 hazardous locations. The bottom line is IDEC SmartRelays provide the right solution for all your control needs!

Why wait? Replace your complicated system of relays, timers, and counters with just one IDEC SmartRelay! These all-in-one controllers require less space in your control cabinet. And as you know, space in your panel is money in your pocket. Combine that with low maintenance and you've got a cost-effective product you can count on for all your control operations

Applications

Industrial Facility Systems

- Conveyor systems
- Elevator controls
- Liquid level controls
- Motor, pump and valve controls
- Water treatment and irrigation systems

Housing and Building Management

- Lighting controls
- HVAC
- Gate and door controls
- Shutter and sun blind controls
- Water and sprinkler systems

Unique Solutions

- Solar-electric systems
- Traffic light controls
- Ventilation systems on ships

Monitoring Systems

- Access controls
- Alarm systems
- Parking lot control monitoring

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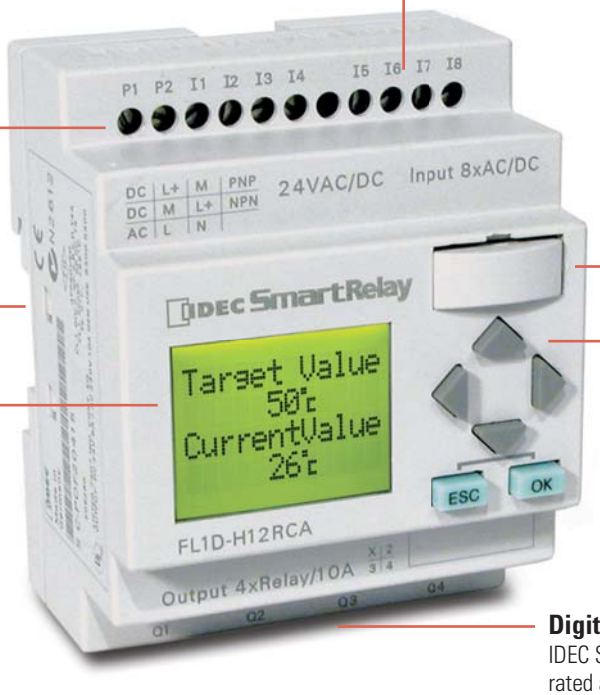
Performance & Features con't

Digital/Analog Inputs
Each SmartRelay is equipped with 8 digital inputs for you to utilize in your applications. On selected models such as FL1D-H12RCE, FL1D-B12RCE and FL1D-H12SND, inputs 5 and 6 can be used as fast inputs up to 2 Khz and inputs 7 and 8 can be configured as 0-10V analog inputs. A maximum of 24 digital inputs can be utilized with this system using digital expansion modules.

Universal Voltages
SmartRelays are available in 12/24VDC, 24VAC/DC, and 100-240VAC/DC voltages.

DIN Rail or Surface Mountable

Backlit LCD Display
System status — input, output, analog values, timers and counters — can be monitored through an embedded 4x12 LCD on your SmartRelay. This allows you to display a predefined message with up to 48 characters chosen from 103 special character types. You can now adjust the contrast on your display screen to your preference. Non-LCD versions are also available.



Multifunction Interface
If you prefer not to program your SmartRelay using the LCD and keypad, simply connect the interface cable to your PC and program with our WindLGC software instead. Or you can plug-in the special memory cartridge (FL1C-PM3) and have your SmartRelay operate the circuit program through the cartridge itself.

Operational Control Buttons
IDEC SmartRelays can be programmed with just the push of a button! Control buttons can be used to program, modify and change preset parameters. The four cursor keys can also be configured as inputs if needed.

Digital Outputs
IDEC SmartRelays are equipped with 4 relay outputs rated at 10A/pt. A maximum of 16 outputs can be configured with this system using digital expansion modules.

EEPROM memory
Never worry about your program being lost again! With IDEC SmartRelays, your program is stored in a non-volatile EEPROM.

Password Protection
Concerned about your program being copied or altered? IDEC SmartRelays keep you safe with a unique password protection scheme allowing end users to access certain parameters without seeing or modifying the actual program.

Large Program Capacity
Running out of program space is a thing of the past. IDEC SmartRelays can handle up to 130 function blocks (2000 bytes).

Integrated Functions
8 predefined basic function blocks and 28 special function blocks ensure that almost all your conventional switching devices — timers and counters — can be replaced. Three functions include a PI controller (e.g. for temperature control), a two-stage ramp function (e.g. for the control of frequency converters) and an analog multiplexer (e.g. for light control).

Quality
IDEC means quality and dependability you can trust and our SmartRelays are no exception. Each model is UL listed, CE certified, EMC compliant, FM approved for Class 1 Div 2 hazardous locations, C-tick compliant, Lloyds Registered, and ABS approved.

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Selection Guide

Base Modules – with LCD

Appearance	Part Number	Voltage	Input Signal	Input	Output	With Clock
	FL1D-H12RCE	12/24V DC	DC I7 and I8 are used for digital/analog	PNP	Relay	Yes
	FL1D-H12SND	24V DC			Transistor Source	—
	FL1D-H12RCA	24V AC/DC	AC/DC	PNP/NPN	Relay	Yes
	FL1D-H12RCC	100-240V AC/DC		PNP		

Base Modules – without LCD

Appearance	Part Number	Voltage	Input Signal	Input	Output	With Clock
	FL1D-B12RCE	12/24V DC	DC I7 and I8 are used for digital/analog	PNP	Relay	Yes
	FL1D-B12RCA	24V AC/DC	AC/DC	PNP/NPN	Relay	Yes
	FL1D-B12RCC	100-240V AC/DC		PNP		

Digital I/O Expansion Modules

- 8-pt expansion module (4 in/4 out)
- Max. 4 digital expansion modules

Appearance	Part Number	Total I/O	Input Power	Input	Output
	FL1B-M08B2R2	8 (4 in/ 4 out)	12/24V DC	DC	Relay
	FL1B-M08B1S2		24V DC		Transistor Sink
	FL1B-M08C2R2		100-240V AC/DC	AC/DC	Relay
	FL1B-M08D2R2		24V AC/DC		

Analog I/O Expansion Modules

- 2-pt Analog input module
- 2-pt Analog output module
- 10-bit resolution
- Max. 4 analog input modules and 1 analog output module

Appearance	Part Number	Total I/O	Input Power	Input	Output
	FL1B-J2B2	2 (2 in/0 Out)	12/24V DC	0-10V, 4-20mA	—
	FL1D-K2B2	2 (0 in/2 Out)	24V DC	—	0-10V

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LonWorks® Communication Module

- LonWorks® Communication module contains standard network variable type (SNVT) to achieve open network communication for building automation
- Maximum virtual inputs/analog inputs/outputs: 16/8/12 points
- An external interface file (XIF extension) unique to each LonWorks® module is needed to communicate through the LonWorks® network and can be downloaded at www.idec.com/smartrelay

Appearance	Part Number	Module	Input Power	Total I/O
	FL1B-CL1C12	LonWorks® Communication Module	24V AC/DC	Input: 16 points Analog Input: 8 points Output: 12 points

*LonWorks® is a registered trademark of Echelon

AS-Interface Communication Module

- The AS-Interface communication module provides optimum solutions for decentralized controls and savings in installation space and wiring
- Virtual I/O points: 4 inputs, 4 outputs

Appearance	Part Number	Module	Input Power	Total I/O
	FL1B-CAS2	AS-Interface Communication Module	30V DC	Input: 4 points Output: 4 points

Starter Kits

IDEC SmartRelay Starter Kit is an economical and ideal solution for first time IDEC SmartRelay users

- Package includes a base module, WindLGC programming software, programming cable, simulator switch (DC models only) and a user's manual

Starter Kits

Part Number	Description
SMARTSTART-BAC-D	FL1D-B12RCC, WindLGC software and programming cable
SMARTSTART-BDC-D	FL1D-B12RCE, WindLGC software, programming cable, and simulator switch
SMARTSTART-HAC-D	FL1D-H12RCC, WindLGC software and programming cable
SMARTSTART-HDC-D	FL1D-H12RCE, WindLGC software, programming cable, and simulator switch

User's Manual
FL9Y-B966-0

WindLGC Software
FL9Y-LP1CDW

Accessories

Part Number	Description
FL1C-PM3	Memory cartridge, with user defined protection feature
FL9Y-LP1CDW	Programming Software: WindLGC Ver. 5.0 CD w/Online Manual
FL1A-PC1	Programming Cable
BNDN1000	35mm Aluminum DIN Rail, 1m/3.28ft
BNL6	End Clips, Prevents modules from sliding off DIN Rail
MT-101	Memory Cartridge Removal Tool
FL1B-PSP1	Mounts Module Directly to Panel
FL1B-Y1371-SW8	8pt Input Simulator Switch, Used with 12, 24V DC Base Module Only
FL9Y-B966-0	FL1D User's Manual, Available for download at: www.idec.com/smartrelay
FC4A-USB	USB to RS232 Converter, For use with "USB Only" PC's

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WindLGC

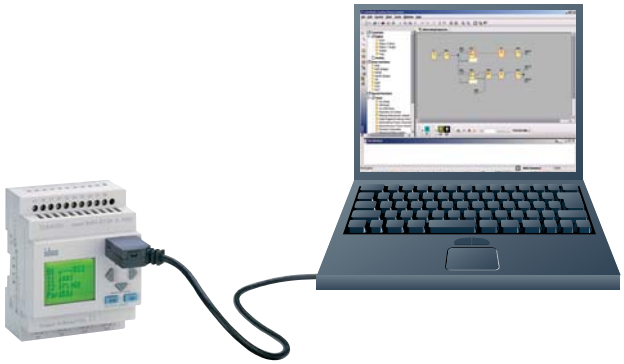
Programming Software

WindLGC is the exclusive programming software for the IDEC SmartRelay using Windows®. Edit, save, and print out your programs.

Features:

- Ladder programming
- Online Monitor
- Program Comparison
- Time Simulation
- Simplified connection of the functions
- Programs can be saved in PDF or JPG format

Just click the function blocks you need and link function blocks for easy wiring. Devise complicated circuits using the convenient functions of WindLGC.



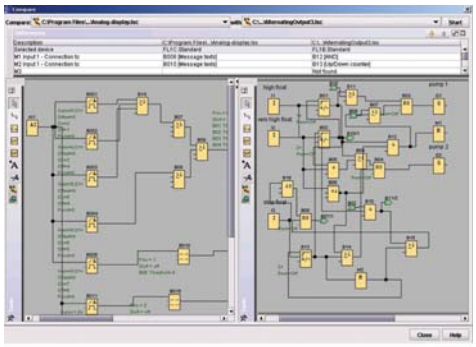
Part Number

Part Number	Description
FL9Y-LP1CDW	WindLGC programming software for IDEC SmartRelay

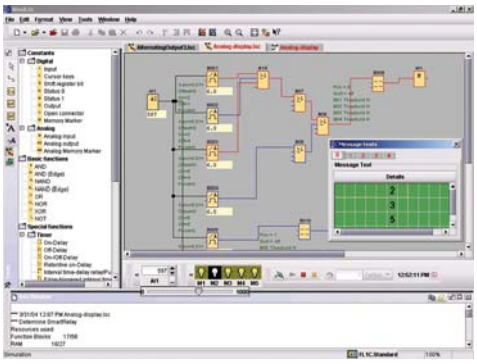
WindLGC system requirements:

- OS: Windows95/98/ME/NT/2000/XP/Vista
- CPU recommendation: Pentium 266MHz or higher
- Memory: 64MB or more
- RAM recommendation: 128MB
- Hard disk space: 90MB or more for installing WindLGC software.
- Monitor Recommendation: Display more than 800 x 600 dots and 256 colors
- Free download service, if upgrading from WindLGC Version 3.0 to Version 5.0, available at www.idec.com/usa

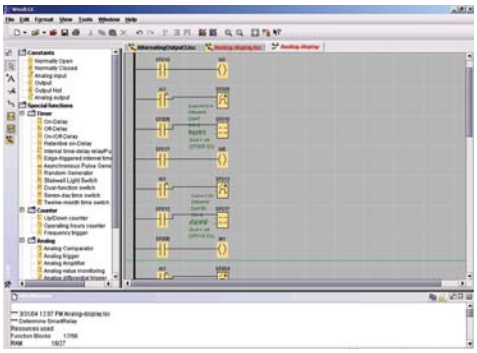
Program Comparison



Simulation Mode/Online Monitor



Ladder Programming



For more information, see the Automation Software section.

Visit **www.idec.com/downloads** for free upgrades or a free demo version.

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Specifications

Base Modules

Base Module Part Number			FL1D-H12SND	FL1D-H12RCE FL1D-B12RCE	FL1D-H12RCA FL1D-B12RCA	FL1D-H12RCC FL1D-B12RCC
Power Supply	Rated Power Voltage		24V DC	12/24V DC	24V AC/DC	100 to 240V AC/DC
	Allowable Voltage Range		20.4 to 28.8V DC	10.8 to 28.8V DC	20.4 to 26.4V AC 20.4 to 28.8V DC	85 to 265V AC 100 to 253V DC
	Rated Frequency		—	—	47 to 63Hz	47 to 63Hz
	Current Draw		30 to 55mA (24V DC)	30 to 140mA (12V DC) 20 to 75mA (24V DC)	40 to 110mA (24V AC) 20 to 75mA (24V DC)	10 to 40mA (100V AC) 10 to 25mA (240V AC) 5 to 25mA (100V DC) 5 to 15mA (240V DC)
	Allowable Momentary Power Interruption		—	2ms (Typ.) (12V DC) 5ms (Typ.) (24V DC)	5ms (Typ.) (24V AC/DC)	10ms (Typ.) (100V AC/DC) 20ms (Typ.) (240V AC/DC)
	Power Consumption		0.7 to 1.3W (24V DC)	0.3 to 1.7W (12V DC) 0.4 to 1.8W (24V DC)	0.9 to 2.7VA (24V AC) 0.4 to 1.8W (24V DC)	1.1 to 4.6VA (100V AC) 2.4 to 6.0VA (240V AC) 0.5 to 2.9W (100V DC) 1.2 to 3.6W (240V DC)
	Reverse Polarity Protection		Yes	Yes	—	—
Clock	Backup Duration		—	80 hours (25°C)	80 hours (25°C)	80 hours (25°C)
	Clock Accuracy		—	±5 sec/day maximum	±5 sec/day maximum	±5 sec/day maximum
Input	Input Signal		DC	DC	AC/DC	AC/DC
	Input Points		8 (I1 to I8)	8 (I1 to I8)	8 (I1 to I8)	8 (I1 to I8)
	Analog Input Points		2 (I7, I8)	2 (I7, I8)	—	—
	High-speed Input [1]		2 (I5, I6), 2Khz maximum	2 (I5, I6), 2Khz maximum	—	—
	Analog Input Range		0 to 10V DC (max. rated input: 28.8V DC)	0 to 10V DC (max. rated input: 28.8V DC)	—	—
	Analog Input Error		±1.5 (of full scale)	±1.5 (of full scale)	—	—
	Analog Input Resolution		10 bits (0 to 1000)	10 bits (0 to 1000)	—	—
	Allowable Voltage Range		0 to 28.8V DC	0 to 28.8V DC	0 to 26.4V AC 0 to 28.8V DC	0 to 265V AC 0 to 253V DC
	Input Impedance	Digital Input	3.5kΩ	3.5kΩ	4.8kΩ	840kΩ
		Analog Input	78kΩ	76kΩ	—	—
	Isolation		—	—	—	—
	Operating Range	OFF Voltage	< 5V DC	< 5V DC	< 5V AC/DC	< 40V AC < 30V DC
		ON Voltage	≥ 12V DC	≥ 8.5 V DC	≥ 12V AC/DC	≥ 79V AC ≥ 79V DC
		OFF Current	< 0.85mA (I1 to I6) < 0.05mA (I7, I8)	< 0.85mA (I1 to I6) < 0.05mA (I7, I8)	< 1.0mA	< 0.03mA
		ON Current	≥ 2mA (I1 to I6) ≥ 0.15mA (I7, I8)	≥ 1.5mA (I1 to I6) ≥ 0.1mA (I7, I8)	≥ 2.5mA	≥ 0.08mA 100V AC: 50ms (Typ.)
	Turn ON Time		1.5ms (Typ.) (I1 to I4) ≤ 1.0ms (I5, I6) 300ms (Typ.) (I7, I8)	1.5ms (Typ.) (I1 to I4) ≤ 1.0ms (I5, I6) 300ms (Typ.) (I7, I8)	1.5ms (Typ.)	240V AC: 30ms (Typ.) 100V DC: 25ms (Typ.) 240V DC: 125ms (Typ.)
	Turn OFF Time		1.5ms (Typ.) (I1 to I4) ≤ 1.0ms (I5, I6) 300ms (Typ.) (I7, I8)	1.5ms (Typ.) (I1 to I4) ≤ 1.0ms (I5, I6) 300ms (Typ.) (I7, I8)	15ms (Typ.)	100V AC: 65ms (Typ.) 240V AC: 105ms (Typ.) 100V DC: 95ms (Typ.) 240V DC: 125ms (Typ.)
	Wire Length		100 m [2]	100 m [2]	100 m	100 m

1. When selecting frequency trigger function.
2. 10m when connected to analog input (twisted pair cable)

Initialization Time: After power-up, the FL1D takes a maximum of 10 seconds (9 seconds without using a memory cartridge) for initialization. When initialization is complete, the FL1D can be set to RUN mode.

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Base Module Part Number		FL1D-H12SND	FL1D-H12RCE FL1D-B12RCE	FL1D-H12RCA FL1D-B12RCA	FL1D-H12RCC FL1D-B12RCC
Output	Output	Transistor source	Relay	Relay	Relay
	Output Points/ Contact Configuration	4 points (separate)	4NO contacts	4NO contacts	4NO contacts
	Isolation	—	Isolated	Isolated	Isolated
	Dielectric Strength (between power/input terminals and output terminals)	—	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute
	Output Voltage	External power voltage	—	—	—
	Maximum Load Current	0.3A	Resistive load 10A at 12/24V AC/DC 10A at 100/120V AC 10A at 230/240V AC Inductive load 2A at 12/24V AC/DC 3A at 100/120V AC 3A at 230/240V AC	Resistive load 10A at 12/24V AC/DC 10A at 100/120V AC 10A at 230/240V AC Inductive load 2A at 12/24V AC/DC 3A at 100/120V AC 3A at 230/240V AC	Resistive load 10A at 12/24V AC/DC 10A at 100/120V AC 10A at 230/240V AC Inductive load 2A at 12/24V AC/DC 3A at 100/120V AC 3A at 230/240V AC
	Surge Current	—	30A maximum	30A maximum	30A maximum
	Short-circuit Protection	Built-in current limiting resistor: Approx. 1A	External fuse required: 16A maximum	External fuse required: 16A maximum	External fuse required: 16A maximum
	Minimum Switching Load	—	10mA, 12V DC	10mA, 12V DC	10mA, 12V DC
	Initial Contact Resistance	—	100 mΩ maximum (at 1A, 24V DC)	100 mΩ maximum (at 1A, 24V DC)	100 mΩ maximum (at 1A, 24V DC)
	Mechanical Life	—	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)
	Electrical Life	—	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour
Switching Rate	Mechanical Load	—	10Hz		10Hz
	Electrical Load	10Hz	—	—	—
	Resistive Load/Lamp Load [3]	10Hz	2Hz	2Hz	2Hz
	Inductive Load	0.5Hz	0.5Hz	0.5Hz	0.5Hz

3. For fluorescent lamps, if the inrush current exceeds the allowable value, use an appropriate relay.

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Expansion I/O Module

Expansion I/O Module Part Number			FL1B-M08B1S2	FL1B-M08B2R2	FL1B-M08D2R2	FL1B-M08C2R2	FL1B-J2B2	FL1D-K2B2
Power Supply	Rated Power Voltage		24V DC	12/24V DC	24V AC/DC	100 to 240V AC/DC	12/24V DC	24V DC
	Allowable Voltage Range		20.4 to 28.8V DC	10.8 to 28.8V DC	20.4 to 26.4V AC 20.4 to 28.8V DC	85 to 265V AC 100 to 253V DC	10.8 to 28.8V DC	20.4 to 28.8V DC
	Rated Frequency		—	—	50/60Hz (47 to 63Hz)	50/60Hz (47 to 63Hz)	—	—
	Current Draw		30 to 45mA	30 to 140mA (12V DC) 20 to 75mA (24V DC)	40 to 110mA (24V AC) 20 to 75mA (24V DC)	10 to 30mA (100V AC) 10 to 20mA (240V AC) 5 to 15mA (100V DC) 5 to 10mA (240V DC)	25 to 50mA	25 to 50mA
	Allowable Momentary Power Interruption		—	2ms (Typ.) (12V DC) 5ms (Typ.) (24V DC)	5ms (Typ.) (24V AC/DC)	10ms (Typ.) (100V AC/DC) 20ms (Typ.) (240V AC/DC)	2ms (Typ.) (12V AC/DC) 5ms (Typ.) (24V AC/DC)	5ms (Typ.)
	Power Consumption		0.8 to 1.1W	0.3 to 1.7W (12V DC) 0.4 to 1.8W (24V DC)	0.9 to 2.7VA (24V AC) 0.4 to 1.8W (24V DC)	1.1 to 3.5VA (100V AC) 2.4 to 4.8VA (240V AC) 0.5 to 1.8W (100V DC) 1.2 to 2.4W (240V DC)	0.3 to 0.6W (12V DC) 0.6 to 1.2W (24V DC)	0.6 to 1.2W (24V DC)
	Reverse Polarity Protection		Yes	Yes	—	—	Yes	Yes
Input	Input Signal		DC input	DC input	AC/DC input	AC/DC input	Analog input	—
	Input Points		4	4	4	4	—	—
	Isolation		—	—	—	—	—	—
	Allowable Voltage Range		0 to 28.8V DC	0 to 28.8V DC	0 to 26.4V AC 0 to 28.8V DC	0 to 265V AC 0 to 253V DC	—	—
	Operating Range	OFF Voltage	< 5V DC	< 5V DC	< 5V AC/DC	< 40V AC < 30V DC	—	—
		ON Voltage	≥ 12V DC	≥ 8.5V DC	≥ 12V AC/DC	≥ 79V AC ≥ 79V DC	—	—
		OFF Current	< 0.85mA	< 0.85mA	< 1.0mA	< 0.03mA	—	—
		ON Current	≥ 2mA	≥ 1.5mA	≥ 2.5mA	≥ 0.08mA	—	—
	Turn ON Time		1.5ms (Typ.)	1.5ms (Typ.)	1.5ms (Typ.)	100V AC: 50ms (Typ.) 240V AC: 30ms (Typ.) 100V DC: 25ms (Typ.) 240V DC: 15ms (Typ.)	—	—
	Turn OFF Time		1.5ms (Typ.)	1.5ms (Typ.)	1.5ms (Typ.)	100V AC: 65ms (Typ.) 240V AC: 105ms (Typ.) 100V DC: 95ms (Typ.) 240V DC: 125ms (Typ.)	—	—
	Analog Input Points		—	—	—	—	2	—
	Analog Input Range		—	—	—	—	0 to 10V (max. rated input: 28.8V) 0 to 20mA (max. rated input: 40mA)	—
	Digital Resolution		—	—	—	—	10 bits (0 to 1000)	—
	Input Error		—	—	—	—	±1.5% (of full scale)	—
	Input Impedance		—	—	—	—	76kΩ (0 to 10V) 155 to 250Ω (0 to 20mA)	—
	Sampling Cycle		—	—	—	—	50ms	—

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Expansion I/O Module Part Number		FL1B-M08B1S2	FL1B-M08B2R2	FL1B-M08D2R2	FL1B-M08C2R2	FL1B-J2B2	FL1D-K2B2
Output	**Wire Length**	100 m	100 m	100 m	100 m	10 m (twisted-pair shielded cable)	—
	Output	Transistor source	Relay	Relay	Relay	—	Analog
	Output Points/ Contact Configuration	4 points (separate)	4NO contacts	4NO contacts	4NO contacts	—	—
	Isolation	—	Isolated	Isolated	Isolated	—	—
	Dielectric Strength (between power/input terminals and output terminals)	—	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute	—	—
	Output Voltage	External power voltage (20.4 to 28.8V DC)	—	—	—	—	—
	Maximum Load Current	0.3A	Resistive load 5A at 12/24V AC/DC 5A at 100/120V AC 5A at 230/240V AC Inductive load 2A at 12/24V AC/DC 3A at 100/120V AC 3A at 230/240V AC	Resistive load 5A at 12/24V AC/DC 5A at 100/120V AC 5A at 230/240V AC Inductive load 2A at 12/24V AC/DC 3A at 100/120V AC 3A at 230/240V AC	Resistive load 5A at 12/24V AC/DC 5A at 100/120V AC 5A at 230/240V AC Inductive load 2A at 12/24V AC/DC 3A at 100/120V AC 3A at 230/240V AC	—	—
	Short-circuit Protection	Built-in current limiting resistor: Approx. 1A	External fuse required: 16A maximum	External fuse required: 16A maximum	External fuse required: 16A maximum	—	Yes
	Minimum Switching Load	—	10mA, 12V DC	10mA, 12V DC	10mA, 12V DC	—	—
	Initial Contact Resistance	—	100 mΩ maximum (at 1A, 24V DC)	100 mΩ maximum (at 1A, 24V DC)	100 mΩ maximum (at 1A, 24V DC)	—	—
	Mechanical Life	—	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)	—	—
	Electrical Life	—	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour	—	—
	Analog Output Points	—	—	—	—	—	2
	Analog Output Range	—	—	—	—	—	0 to 10V
	Digital Resolution	—	—	—	—	—	10 bits (0 to 1000V)
	Output Error	—	—	—	—	—	±2.5% (of full scale)
	Output Impedance	—	—	—	—	—	5kΩ
	Analog Value Conversion Interval	—	—	—	—	—	50ms
	Wire Length	—	—	—	—	—	10 m (twisted-pair shielded cable)
Switching Rate	**Mechanical Load**	—	10Hz	10Hz	10Hz	—	—
	Electrical Load	10Hz	—	—	—	—	—
	Resistive Load/Lamp Load	10Hz	2Hz	2Hz	2Hz	—	—
	Inductive Load	0.5Hz	0.5Hz	0.5Hz	0.5Hz	—	—

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General

Item		Specification	Standard
Operating Temperature	Horizontal Mounting	0 to 55°C	Cold: IEC60068-2-1 Hot: IEC60068-2-2
	Vertical Mounting	0 to 55°C	
Storage/Transportation Temperature		–40 to +70°C [1]	—
Relative Humidity		10 to 95% RH [2]	IEC60068-2-30
Atmospheric Pressure		795 to 1080 hPa	—
Operating Condition		No corrosive gas	—
Degree of Protection		IP20	—
Vibration Resistance		5 to 9Hz, amplitude 3.5mm 9 to 150Hz, acceleration 9.8m/s^2 (1G)	IEC60068-2-6
Shock Resistance		147m/s^2 (15G)	IEC60068-2-27
Drop Test		50mm	IEC60068-2-31
Drop Test (packaged)		1m	IEC60068-2-32
Emission		Class B Group 1 [3]	EN55011
Electrostatic Discharge		8kV air discharge 6kV contact discharge [4]	IEC61000-4-2
Electromagnetic Fields		10V/m	IEC61000-4-3
Burst Pulses		2kV (power line) 1kV (I/O signal line) [5]	IEC61000-4-4
Energy Carriers Single Pulse (Surge) [6] (FL1B-H12RCC, FL1B-B12RCC only)		1kV (power line) normal 2kV (power line) common	IEC61000-4-5
Communication Cable		0.5 to 2.5mm^2 (one wire) 0.5 to 1.5mm^2 (two wires)	—
Terminal Style		Finger-safe type [7]	—

1. No freezing
2. No condensation
3. Class A for AS-Interface communication module
4. 8kV (air discharge), 4kV (contact discharge) for AS-Interface communication module
5. 1kV (criteria A), 2kV (criteria B) for AS-Interface communication module
6. For protection against surge noise on DC power supply types (FL1D-H12RCE/B12RCE, FL1D-H12SND, FL1D-H12RCA/B12RCA), use surge absorbers, noise cut transformers, or noise filters.
7. Tightening torque 0.4 to 0.5 N·m

AS-Interface Communication Module

Specifications

Module Type	AS-Interface slave module
Slave Type	Standard
Profile	I/O code: 7
	ID code: F
	ID2 code: F
Input/Output	Virtual input: 4
	Virtual output: 4
AS-Interface Voltage	30V DC (26.5 to 31.6V DC)
Current Draw	70 mA maximum (AS-Interface)

I/O Allocation

Input		Output	
AS-Interface	SmartRelay	SmartRelay	AS-Interface
Output Data Bit D0	Input In	Output Qm	Input Data Bit D0
Output Data Bit D1	Input In+1	Output Qm+1	Input Data Bit D1
Output Data Bit D2	Input In+2	Output Qm+2	Input Data Bit D2
Output Data Bit D3	Input In+3	Output Qm+3	Input Data Bit D3

1. I/O point numbers "n" and "m" of the SmartRelay are automatically allocated by the base module according to the mounted position of the AS-Interface communication module.
2. AS-Interface communication module is IP20 terminal type.
3. AS-Interface cable is connected to the terminal block.

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LonWorks® Communication Module

Specifications

Power Voltage		24V AC/DC (20.4 to 26.4V AC / 20.4 to 28.8V DC)
Frequency		50/60 Hz (47 to 63 Hz)
Current Draw		33 mA max.
Communication System		LON® system
Transceiver		FTT-10A
Topology		Bus topology / Free topology
Transmission Rate		78 kbps
Neuron Chip		TMPN3120FE5M (Toshiba)
CPU Clock Frequency		20 MHz
Transmission Distance	**Bus topology**	1,400 m (only FTT-10A transceiver, when using Level 4 AWG22 cable)
	Free topology	500 m total, 400 m between nodes (when using Level 4 AWG22 cable)

Configuration Property

	SCPT Type	Application
Configuration Property	SCPTmaxSendTime: (Quantity 12)	Send heartbeat

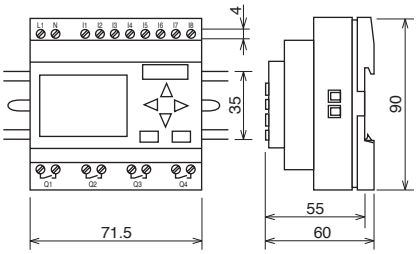
Network Variables

	SNVT Type	Application
Input Network	SNVT_obj_request: (Quantity 1)	Request object mode
Variable	SNVT_switch: (Quantity 14)	Switch light, alarm, window contact, free inputs/outputs
	SNVT_occupancy: (Quantity 2)	Occupancy
	SNVT_temp_p: (Quantity 1)	Room temperature (°C)
	SNVT_lux: (Quantity 1)	Brightness - light-ening level (lux)
	SNVT_lev_percent: (Quantity 6)	Position (%)
Output Network	SNVT_obj_status: (Quantity 1)	Output object status
Variable	SNVT_switch: (Quantity 8)	Switch light, alarm, window contact, free inputs/outputs
	SNVT_occupancy: (Quantity 2)	Occupancy
	SNVT_tod_event: (Quantity 2)	Scheduler program
		Just current state

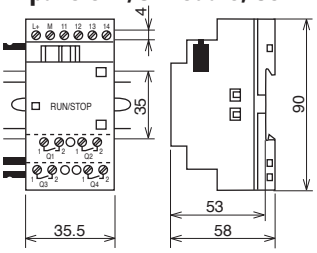
Block Diagram

Dimensions (mm)

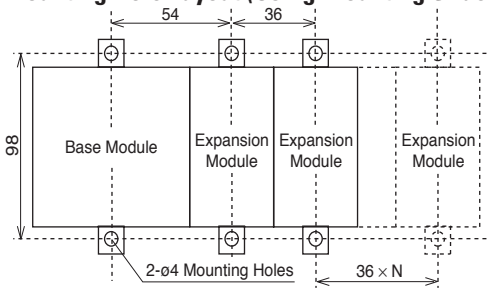
Base Module



Expansion I/O Module, Communication Module



Mounting Hole Layout (Using Mounting Slides)



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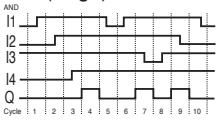
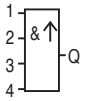
Function Blocks

General

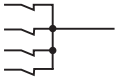
• AND (Edge)



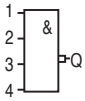
Edge detection with edge evaluation (pos. edge)



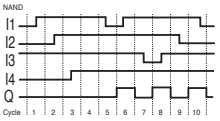
• NAND



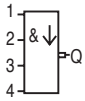
Parallel connection of normally closed contacts



• NAND (Edge)

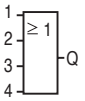


Edge detection with edge evaluation (pos. edge)



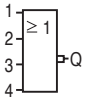
• OR

Parallel connection of normally open contacts

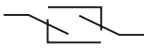


• NOR

Series connection of normally closed contacts



• XOR



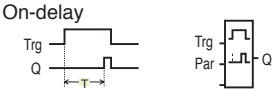
Double changeover contact

• NOT

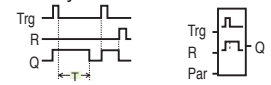
Connection of closed contact

Special

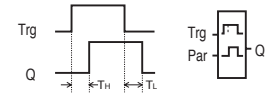
• On-delay



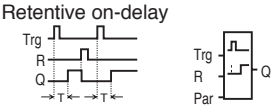
• Off-delay



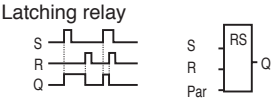
• On-/Off-delay



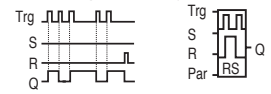
• Retentive on-delay



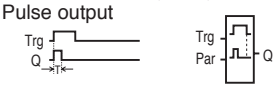
• Latching relay



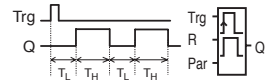
• Current impulse relay



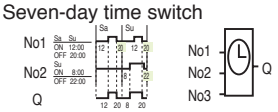
• Interval time-delay relay/ Pulse output



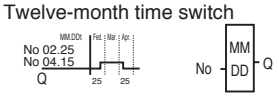
• Edge-triggered interval time-delay relay



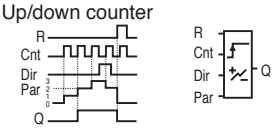
• Seven-day time switch



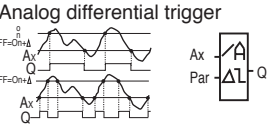
• Twelve-month time switch



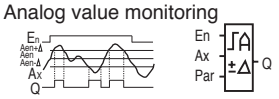
• Up/down counter



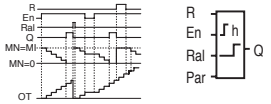
• Analog differential trigger



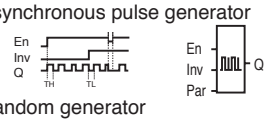
• Analog value monitoring



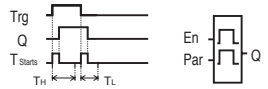
• Operating hours counter



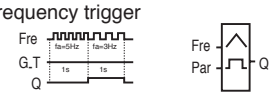
• Asynchronous pulse generator



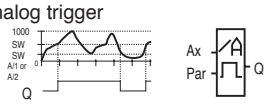
• Random generator



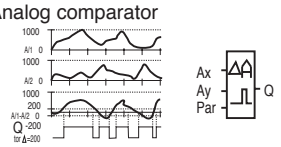
• Frequency trigger



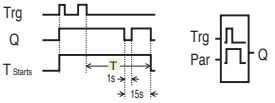
• Analog trigger



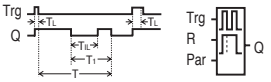
• Analog comparator



• Stairwell light switch

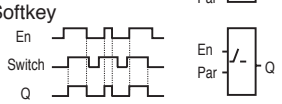


• Dual-function switch



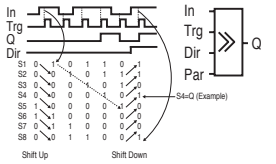
• Message texts

• Softkey

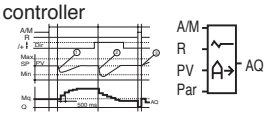


• Analog amplifier

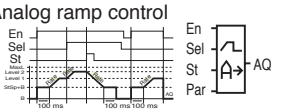
• Shift register



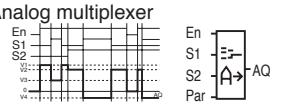
• PI controller



• Analog ramp control



• Analog multiplexer



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